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Established 1914

CHEMICAL INDUSTRIES

Vol. 40 May 1937 No. 5

Published monthly and entered as 2d class matter Dec. 22, 1934, at the Post Office at New Haven, Conn., under the Act of March 3, 1879. Subscription, domestic and Canada, $3 a year; foreign, $4.

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THEY CALL HIM
"The Drummer"
JIM CAMPBELL, hearty Louisiana native, runs the drum shop in Mathieson's new alkali plant at Lake Charles. Jim will tell you that his is one of the big little jobs in Mathieson's plant. For every single drum has got to be just right and production schedules must be met to the minute if users of Mathieson Caustic Soda are to receive the service they have learned to expect.
Nicknamed "the drummer" by his plant friends, Jim Campbell is typical of the men behind Mathieson Chemicals. Proud of their jobs and proud of their company, these men pull together in a way that makes Mathieson one of the most respected names in the American chemical industry.
The MATHIESON ALKALI WORKS (Inc.)
60 East 42nd Street New York, N.Y.
Mathieson Chemicals

The Reader Writes:—

Big and Little Research

Your editorial on the usefulness of consultants (Chemical Industries, March, 1937) is a most welcome recognition of the value the independence of thought a qualified consultant can produce for a large organization equipped with a qualified research staff. Consultants frequently must overcome the tendency of every such organization to become bogged in the ruts of its own thinking on problems to which it is too close.

Quite a different situation is found in companies of moderate size where limited budgets prevent the full-time employment of men of high caliber to direct research. Here the value of a consultant lies not only in his stimulation of the organization itself, but also in the broader experience and wider contacts which he can focus on the company's problems. The advantages of this type of work by an independent group have been repeatedly demonstrated. After initial growth has been attained the consultant, with his intimate knowledge of the problems to be solved and his wide acquaintance among capable men, is able to guide the management in the wise selection of and planning for a research organization of its own as soon as progress justifies it.

More power to you!

Boston, Mass. Gustavus J. Esselen

Wood vs. Methyl

In view of the publication of the article by M. H. Haertel on the subject of denaturing ethyl alcohol and the use of various formulas including "wood alcohol" and methyl alcohol, may we again refer to our contribution in the Sept. 1934 issue of your paper in which we called attention to the dangerous use of "methyl alcohol" instead of "wood alcohol."

At the time the original denaturing law was passed in 1906 methyl alcohol and wood alcohol were the same. Since then synthetic methyl alcohol has been produced in large quantities. As it has not the same impurities which are associated with wood alcohol its use as denaturant is useless and dangerous. The use of a semi-refined wood alcohol for denaturing is effective in preventing its use as beverage as its violent sharp taste immediately warns one while synthetic wood alcohol gives no warning except sudden death.

May we again make a plea for the use of wood alcohol instead of methyl alcohol to provide a suitable denatured alcohol that cannot be drunk by would-be violators of the law and that no one can unsuspectingly drink with fatal results.

New York City H. O. Chute

Origin of the Term "Proof"

In the interesting article in your March issue on "C. D. Alcohol" it is stated (p. 241, footnote) that the origin of the term "proof" is obscure. The following quotation from my *Text-Book of Organic Chemistry* (Bell, London, 1935, p. 186) may throw some light on this point:

"A proof gallon of alcohol is the amount contained in a gallon of proof spirit. *Proof spirit* was originally the weakest spirit capable of firing gunpowder when brought into contact with it and ignited. Proof spirit as now defined contains 49.28 per cent. of alcohol by weight, or 57.10 per cent. by volume at 60° F., and has the specific gravity 0.91976 at 60° F., in comparison with water at 60° F.

"The strength of alcohol-water mixtures in terms of proof spirit is determined by means of a curious instrument known as *Sikes' hydrometer,* which is provided with a graduated stem and a special set of weights. As stated in an Act of 1816 (56 Geo. III, c. 140), 'an instrument hath with great care been completed, and hath, by proper experiments made for the purpose, been ascertained to denote as proof spirit that which at the temperature of 51° Fahrenheit weighs exactly 12/13th part of an equal measure of distilled water.'

"Thus, a spirit 20° under proof contains 80 volumes of proof spirit and 20 volumes of water at 60° F., while 100 volumes of a spirit 25° over proof give 125 volumes of proof spirit when diluted with water. In contrast to this ancient and cumbrous method, the simple scientific way of determining and expressing the strengths of aqueous alcohols consists in taking the specific gravity by an ordinary hydrometer at a standard temperature and referring directly to weight-percentage tables."

The University John Read
St. Andrews, Scotland Professor of Chemistry

Cole Company Not Cited

From time to time we note that your publication carries paragraphs in it which inform the trade and public that certain rumors are false, so we are taking the liberty of asking you whether you could please publish a paragraph in your publication of the following fact.

A certain company has been informing some of our trade that we were cited and fined by the Federal Government because we were selling and shipping Pine Disinfectant which was not Pine Disinfectant and therefore we were adulterating and misbranding. This of course was absolutely untrue and can be checked with the Department of Agriculture.

Long Island City, N. Y. David D. Catts
Cole Chemical Corp.

Forgotten Chemists

All this botanical blither about the executives wearing forget-me-nots leaves me icy. The real forgotten man of the chemical industry is the chemist.

Once upon a time he had a vogue in advertising circles and it was a real treat for a Ph. D. to read your pages of trade announcements upon which he could recognize his fellows. There appeared advertisement after advertisement displaying technical men in spotless garb of hospital white in the most intriguing postures. They peered studiously into microscopes and gazed soulfully at pipettes. But the pose that became almost as stereotyped as the crossed legs of the actress was the chemist holding aloft a test tube in a sort of half-hearted imitation of the Statue of Liberty.

But now, alas, even this modicum of recognition has been wrested from the chemist and bestowed upon the horny-handed son of toil. In your current issue I note a lantern-jawed guy manipulating a bag-filling machine. Another bohunk is industriously twisting a left-handed stop-cock. Two bouncing roustabouts are lolling on the top of a tank car watching the spigot, and Mathieson Alkali even tells us the name of their distinguished day laborer—a pinnacle of publicity that no technician with any company ever achieved in the advertising pages of Chemical Industries and very seldom at any meeting of the American Chemical Society.

No, you chappies from Pennsylvania are both wrong—the forget-me-not, and the sunflower, and the raspberry all go to the chemist.

Cleveland, Ohio Alvin Snyder

CHEMICAL INDUSTRIES

The Chemical Business Magazine

Whither the Wagner Law?

EVERY manufacturer of chemicals comes, in some way or other, within the purview of the Wagner Act. Based upon the Supreme Court's definition of interstate commerce in the labor relations decision, this is almost unanimous legal opinion. Naturally the effects of this law are being discussed with vigor within the industry's executive group. Much of this discussion is speculative; but study of the law in the light of the decision does reveal certain important facts.

In the N. R. A. suits the Government maintained the "stream of commerce" theory which has plainly been strengthened by the Wagner Act decision. Upon this theory are based the proposals for a revival of N. R. A. It will be difficult, however, to prove that price fixing and control of competitive conditions have the same effects as strikes upon the volume of interstate commerce. It is therefore, unlikely that the Administration will risk a second defeat upon the unsupported basis of the Wagner Act. This is confirmed by the President's insistence upon the adoption of his Supreme Court retirement plan before the passage of any laws involving states rights.

The curious apathy of the labor leaders to the decision may have been instinctive, but it has certainly been justified. Though palpably prejudiced in labor's favor, the Wagner law demands a showdown of strength that Lewis is only willing to face part of the time, and it also implies a responsibility that neither he nor Green wish to shoulder for all time upon American unions. It may be that this vaunted legislation will prove a Pyrrhic victory.

But beyond doubt the Supreme Court has put into the hands of Congress powers to regulate the business of the country that are quite new and vastly greater than have been at its command under the historic interpretation of interstate commerce. At this point speculation upon how and when and why this power will be used becomes rife. Today three factors are paramount to any Congressional action: the President's control over the Supreme Court; the development of the strike situation; and the outcome of the Aluminum anti-trust suit. Each of these bristles with uncertainties. And six months hence three, entirely new, now unexpected factors may be determining the course of legislation affecting industry.

Williams Haynes, Publisher, A. M. Corbet, Publication Manager; W. J. Murphy, Editorial Manager; W. F. George, Advertising Manager; D. O. Haynes, Subscription Manager; J. H. Burt, Purchaser.

Southern Capital in Chemical Projects

It is not a very pretty story that is told of the ways and means adopted by one of the large New York banks to discourage the group of Texas bankers from financing a wood pulp plant, and while that bank's substantial interest in International Paper furnishes a perfectly understandable motive, still its crass selfishness has proved a strong stimulant to southern local sentiment. The mingled pride and resentment thus aroused make the task of raising capital for the Texan paper mill much easier than it would otherwise have been. Sentimental financing has its drawbacks; but without emotion there is no action, and, if the chemical development of the South is to make good its promises, action is needed on the part of southern capital.

It is natural and quite proper that the strictly chemical operations—the alkali, bromine, hydrocarbon plants—should be projected by established chemical companies. The expansion of an industrial consuming market for chemicals, however, must depend upon interests outside the chemical field. This is equally true of such southern chemurgic projects as oils, starch, and cellulose. As Robert M. Hanes has pointed out, $3,000,000,000 in the banks from Virginia to Oklahoma are available for loans, to support these expansions.

Everything "Ersatz" Is Not Profitable

Those European countries that are moving heaven and earth to become completely self-sustaining chemically keep up a bold front; but the shouts of praise for their synthetic triumphs are not a little like the lusty whistling of the darky crossing a graveyard at midnight.

In the first place some of these substitutions are pretty poor imitations of the real thing. The samples we have seen and felt of Italy's artificial wool are extremely unimpressive. Secondly, some substitutions that are forced upon chemical processing industries by law are proving unsatisfactory. Private advices from Germany make gloomy reports of the practicability of their carbon black made from naphthalene. Thirdly, some substitutions are so unsound economically that they are simply not worth their cost. This is a delicate subject; but the frankness with which the British Parliament and technical press have been discussing the cost of synthetic fuel from hydrogenated coal points out that this most important item in self-sufficiency has been unwise.

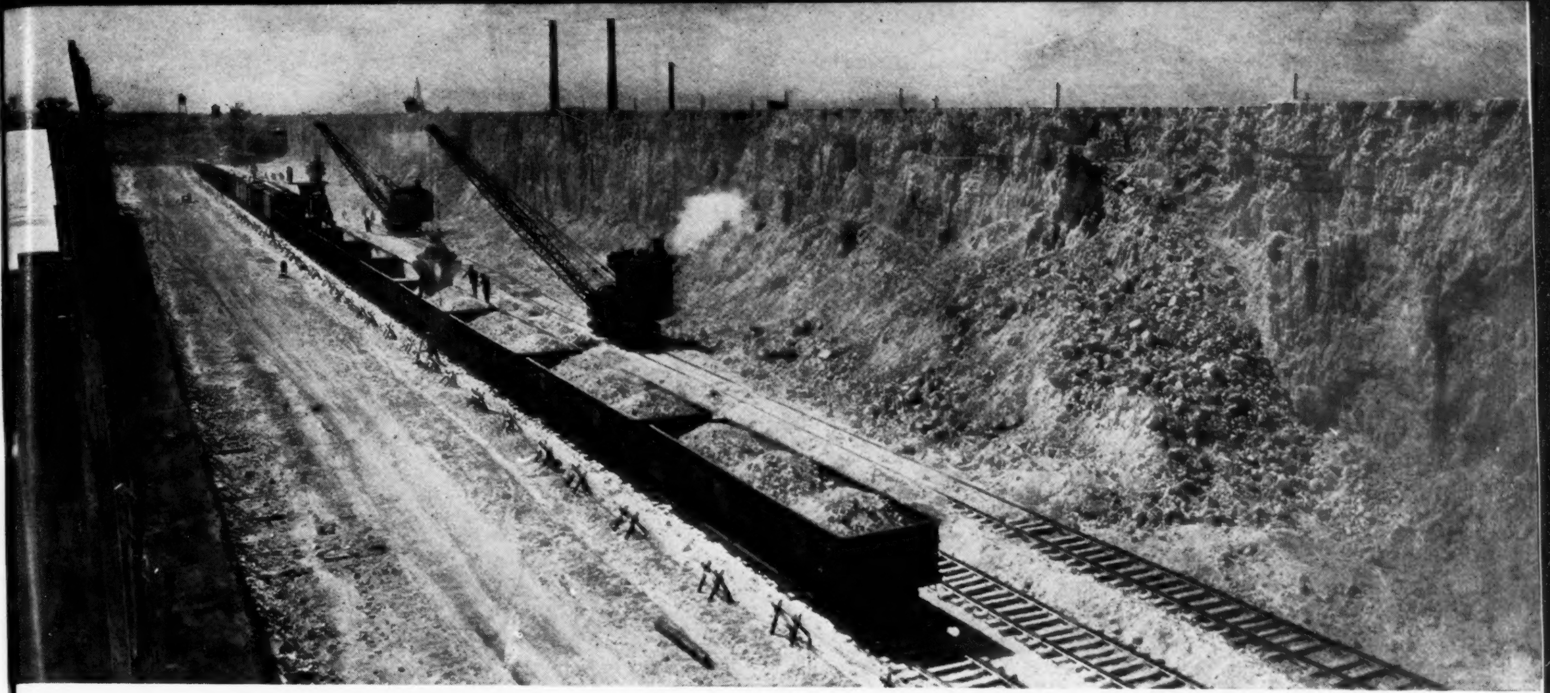
Beneath such specific objections is the broader problem of upsetting an established balance of food and labor supplies. In the British fuel problem, for example, it has been said that to produce synthetic fuel from coal or alcohol or both for war needs plus domestic consumption would require more men than today man the British Navy and more acres than are now devoted to wheat. Germany is already facing the actualities of this problem. In order to cut down meat imports the number of hogs raised this summer is "planned" for twenty-seven and a half million, but this will increase the required importation of feedstuffs to a total of five million tons. The situation is made worse by determined efforts to cut down the acreage of corn, barley and other fodder crops so as to increase the harvest of wheat and rye for human consumption. And in the future, this game of raising pigs on imported feed becomes progressively less and less attractive.

All that glitters is not gold; all substitutes are not triumphs. There is obviously a stress point beyond which it is dangerous to proceed, and it is questionable how long anything like a thorough-going ersatz program can be carried without seriously damaging the morale and industrial growth of a people.

A Law that Checkmates All Coatings Progress

Ignorance is proverbially the stumbling block of progress; but the dexterity is amazing that some lawmakers display in blockading technological advance by well-meant but badly informed legislation. A pretty example has recently been unearthed by "Drugs, Oils & Paints" whose editor is moved to write in vitriol against a bill recently introduced in Georgia. This measure defines "outside ready-mixed paint, grade A" as follows: "contains in the pigment portion a minimum of 20% zinc oxide; 45% white lead, and a maximum of 15% of inert pigment; in the liquid portion a minimum of 85% linseed oil, no moisture and no rosin; in weight it is not to be less than 16 lbs. to the gallon."

As Heckel caustically comments: "These Georgia legislators are barking at a coon that was killed twenty years ago, up a tree that was burned as firewood to warm their ancestors." True enough, and there seems little excuse for law that rules out all the fine technical progress that has so infinitely improved paint formulation by the use of lithopone, titanium, zinc sulfide, to say nothing of the newer synthetic resins and petroleum solvents used in the most modern coatings.



Sulfur

as a Chemical Raw Material

By Raymond F. Bacon

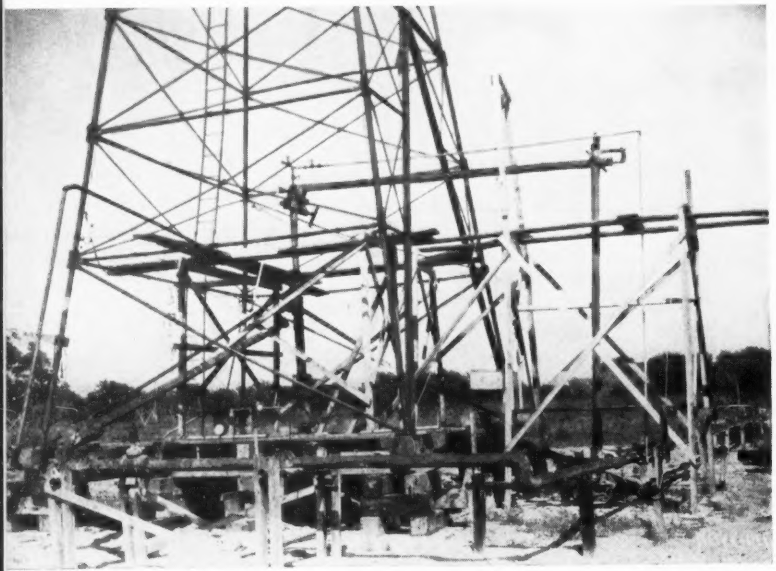
THE major portion of the world's elemental sulfur is produced in the United States and originates in the so-called salt domes of the coastal plain of Texas and Louisiana. The oil companies have been very active in geophysical exploration in this region and have to date located some two hundred domes. Of these two hundred domes only nine have produced sulfur in any substantial quantity.

The original deposit, operated by the Union Sulphur Company in Calcasieu Parish, Louisiana, has long since been exhausted and that Company is no longer marketing sulfur. It produced in about twenty years some 9,500,000 tons. The other domes from which sulfur has been produced are Gulf, Boling, Long Point (Texas Gulf Sulphur Company); Bryan Mound, Hoskins Mound, Grande Ecaille (Freeport Sulphur Company); Palangana, and Jefferson Lake. Of these, Gulf and Bryan Mound have been exhausted, Gulf produced some twelve million tons and Bryan about five million tons. The Duval Sulphur Company made a small production (about 250,000 tons) from Palangana Dome and is now operating on a part of the Boling dome at Newgulf. The Jefferson Lake Oil Company produced some four hundred thousand tons from the dome of that same name in Louisiana, but have now abandoned sulfur operations at that point. This company has recently moved its plant from Louisiana to Clemens Dome in Texas but has not yet started production.

The total production to date of these Texas-Louisiana domes is some 39,000,000 tons. Known reserves in the domes now being operated considerably exceed the total production to date, but the chances of finding new domes containing large amounts of sulfur do not appear promising. The domes at present worked contain the sulfur at a depth of five hundred to two thousand feet. Most newly discovered domes are at great depths, and even if they contain sulfur, its extraction by present methods would not look attractive.

The sulfur in these salt domes occurs in the cap rock and without regard to the exact method of its formation, it seems certain that its origin is from the sulfur of calcium sulfate, which becomes changed to calcium carbonate at those points where the sulfur is found. I will not attempt to discuss any theories of the origin of the sulfur in these dome deposits, as I have never heard any which seemed wholly to satisfy the known facts. One thing is certain, however, and that is that whatever the chemical reactions which caused the reduction of the sulfur from the anhydrite and gypsum, they were low temperature reactions, for there is everything to indicate that these formations have never been subjected to high temperatures. This fact alone discards many theories which assume the formation of sulfur by reactions which are only known to take place at high temperatures.

The method of production by melting the sulfur in situ with superheated water has been described often. Many chemists, however, do not realize that these sulfur bearing strata are water tight, so that for each million gallons of hot water pumped into the dome a



Equipment of sulfur producing well

corresponding amount of cold water must be removed· for the formation is filled with saline water. This is done by means of "bleed" wells. The water flowing from the bleed wells contains appreciable quantities of sulfides and poly-sulfides and often quantities of hydrogen sulfide. This bleed water is not only highly corrosive to most metals, but it is advisable to treat it to render it innocuous to fish before discharging it into a stream. In an operation like that carried on by Texas Gulf Sulphur Company at Newgulf, this involves the treatment of some ten million gallons of bleed water per day. In fact the mining of sulfur from domes is fundamentally a large scale operation.

Another very interesting fact connected with the mining of sulfur is the way the water holds its heat underground. The dome at Gulf, now exhausted, contains an estimated 25,000,000,000 gallons of superheated water, and although operations there were interrupted for over three years, the water in the dome is still within a few degrees of the temperature at which it was pumped into the ground, obviously in this man-made spa enough boiling sulfur water for millions of baths.

Pipe lines carrying hot water from boiler house to sulfur wells and lines carrying liquid sulfur to the vats.

The world's production of elemental sulfur is some 2,400,000 tons per year, of which the United States accounts for about 75%. The production and shipments for the last few years are shown in Table I as follows:

Table I

United States Production and Shipments

Year	*Produced Long Tons*	*Shipped Long Tons*	*Approximate Value Shipments*
1930	2,558,981	1,989,917	$35,800,000
1931	2,128,930	1,376,526	24,800,000
1932	890,440	1,108,852	20,000,000
1933	1,406,063	1,637,368	29,500,000
1934	1,421,473	1,613,838	28,900,000
1935	1,632,590	1,634,990	29,300,000
1936	2,015,231	1,967,713	35,400,000

The commercial situation of sulfur in the world markets is governed by a peculiar situation in its use. Eighty-five per cent. of the sulfur is not used as such, but is burned to sulfur dioxide, and from sulfur dioxide it goes into sulfuric acid, or to sulfites for making paper pulp, to mention two major uses. This means that the price of elemental sulfur is governed by the price of competing materials available to make sulfur dioxide. Of these the principal one is iron pyrites and the general situation is shown very well by the data in Table II giving the source of the world's production of sulfuric acid:

Table II

Source of World Production of Sulfuric Acid

	Per cent.	*Equivalent Tons of Sulfur*
Pyrites	63	2,817,000
Sulfur	25	1,130,000
Gases	10	429,000
Sulfates	2	115,000
	100	4,491,000

Obviously the burning of sulfur to make sulfur dioxide is a much simpler operation, requires much less apparatus, and in general is less costly than the roasting of pyrites for the same purpose; consequently sulfur sells for more than the equivalent amount of sulfur in the form of pyrites. Another reason for this differential is the great purity of the sulfur mined on the Gulf coast, which is sold on a basis of 99.5% purity and often runs over 99.9%. It contains no selenium and no arsenic. Selenium is objectionable in sulfur used for the manufacture of paper pulp, and arsenic not only puts this element into sulfuric acid, but poisons the catalyst in case this acid is made by the catalytic process.

Sulfur, as mined, varies in color from the bright yellow color, characteristic of refined sulfur, to brown and almost black. The off color results in part from the bituminous content and in part from the time elapsing between melting below ground and in pumping to the surface.

Of the sulfur producing countries other than the United States, Italy is the most important. In fact sulfur has been produced in Sicily for hundreds of years, and up to the advent of the Frasch process in the United States, Sicily was *the* sulfur producing country of the world. Sulfur is now produced both in Sicily and on the mainland of Italy. The production is from ore obtained from mines by ordinary mining methods. Due to the extension of electric power lines many mines have been mechanized and thoroughly modern methods are used, although there are still many mines in which the ore is broken by hand, loaded into baskets and packed out on the backs of men or animals.

The ore is treated in furnaces in which the sulfur is melted and flows from the bottom of the furnace in a

Sulfur Imported Into and Exported from U. S., 1930-34

Year	Imports for consumption		Exports: Crude		Exports: Crushed, ground, refined, sublimed, and flowers of	
	Lg. tns.	Val.	Lg. tns.	Val.	Lg. tns.	Val.
1930	29	$1,523	593,312	$12,416,233	16,014	$556,029
1931	.....	.....	407,586	8,837,268	12,142	431,785
1932	.....	.....	352,610	7,178,566	7,270	266,210
1933	4,773	67,432	522,515	9,877,879	8,763	316,890
1934	5,839	76,631	503,312	9,294,228	10,116	399,843

molten condition, sulfur itself acting as the fuel. The yield is around 70% and several different grades are prepared which enter the world's market, most of them at lower prices than the very pure American product. The Italian production is around 300,000 tons (301,554 tons in 1935 and 322,482 tons in 1936).

The next important producer is Japan with a production of about 150,000 tons in 1935 and about 172,000 tons in 1936. Japanese sulfur is mostly of volcanic origin and the ores are treated in sealed retorts, the sulfur being distilled off by the use of coal as a fuel. Chile has produced in the last two years about 20,000 tons per year and some of this production has entered the American market on the West Coast. Norway is an important producer with about 70,000 tons per year during the last two years. This sulfur is produced from copper bearing pyrite by a special process involving the use of a blast furnace. There is also a production of some 20,000 tons per year by the Boliden Gold Mines of the northern part of Sweden. In the United States sulfur bearing ores are found in surface deposits in Nevada, California, Wyoming and Utah where small amounts have been produced each year.

There are very few industrial products in which sulfur is not used at some stage of their manufacture, if their production be traced far enough back. It has even been estimated that the average automobile accounts for

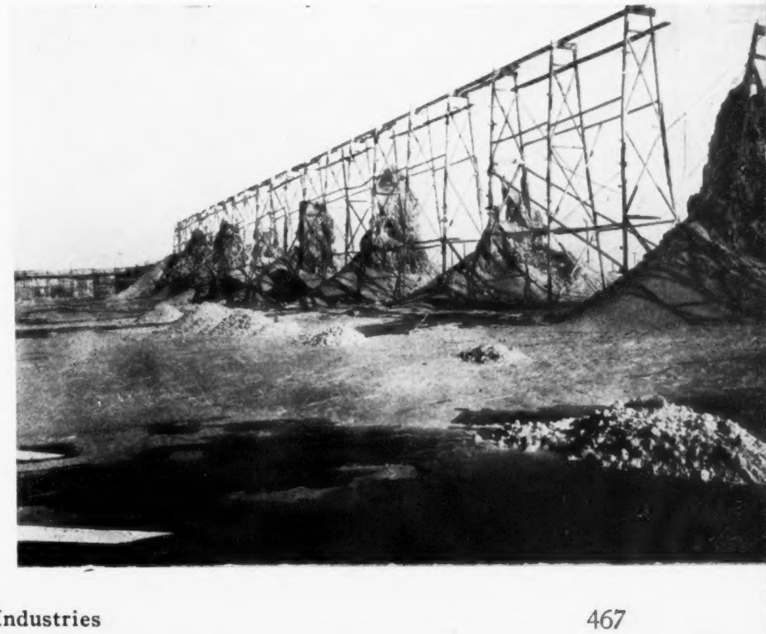
Liquid sulfur discharging from wells into pumping station.

a consumption of about thirty-five pounds of sulfur. In fact the consumption of sulfur could well be used as an index of general industrial activity. The relative importance of the major consumption by industries is, in order of decreasing magnitude, as follows:

1. Acid and Chemicals
2. Superphosphate
3. Pulp and Paper
4. Rubber
5. Agriculture (other than superphosphate)
6. Explosives

Like all substances which enter almost universally into the products of industry, sulfur or sulfuric acid may be partially replaced in the manufacture of some product due to the advance of science in devising new ways of making that product, however, the experience has been that as rapidly as such changes occur the advance in

Storage piles of sulfur.



some other field demands new quantities of sulfur, so that consumption has on the whole shown a small and steady increase.

Although it is not usually considered in formulas for fertilizers, sulfur is probably quite as important a plant food as the commonly recognized phosphorous, nitrogen and potassium. In the ordinary fertilizer mixture the calcium sulfate in the superphosphate supplies the needed sulfur. If the manufacture of available phosphoric acid by electric furnace or other heat methods not involving the use of sulfuric acid should become important, it would be necessary to add substantial amounts of sulfur in some form to the standard fertilizer mixtures in order to make a balanced plant food.

Tests have shown parts of the United States where there is a sulfur deficiency and where the addition of large amounts of sulfur to the soil results in markedly increased crops. As an example, the Oregon Experiment Station has proved that sulfur applied as a fertilizer to many of the arid western soils increases the crops of alfalfa.

Sulfur has long been used as a principal agent for fungus control, and the dusting of grape vines for this purpose comes under the head of a major use. Much work has been done on the use of sulfur as an insecticide. Finely ground sulfur kills some kinds of insects and is a good repellent for most insect pests. Mixtures of sulfur with other materials, such as aluminum sulfide, pyrethrum, derris, and a rosin sulfur compound have been developed which are exceedingly effective as insect killers and markets are gradually being made for such materials. This offers a very large possible increase in tonnage uses of sulfur. To indicate the possibilities, it is only necessary to state that experiments conducted in Texas and confirmed in other southern states show that the insect pests affecting cotton can be well controlled by periodic dusting with sulfur.

Sulfur Consumed in U. S., 1930-34, by Uses, in Long Tons

Use	1930	1931	1932	1933	1934
Heavy chemicals	471,000	327,000	298,000		
Electrochemicals	20,000	16,000	13,000	491,000	512,000
Fine chemicals	13,000	12,000	10,000		
Fertilizer and insecticides	418,000	254,000	155,000	242,000	247,000
Pulp and paper	235,000	178,000	153,000	197,000	176,000
Explosives	48,000	39,000	27,000	37,000	43,000
Dyes and coal-tar products	41,000	39,000	34,000	40,000	34,000
Rubber	31,000	23,000	18,000	24,000	30,000
Paint and varnish	4,500	4,000	4,000	4,000	4,000
Food products	4,500	4,700	4,000	4,000	4,000
Miscellaneous	110,600	72,000	40,000	75,000	60,000
	1,396,600	968,700	756,000	1,114,000	1,110,000

Some new uses which appear promising are as follows: certain sulfur cements with improved properties are now on the market and seem to be finding favor. They are used as jointing material for bell and spigot water pipes; as a mortar in making acid proof tanks; and as a mortar in setting tile floors where the conditions, especially as regards acids, may be severe. A sulfur asphalt composition has been developed which seems superior to asphalt, in that while it retains the good properties of that substance, it is much better in that it does not soften with moderate heat, nor become brittle at colder temperatures, and has great resistance toward corrosive liquids. It has been tried as a flooring material where conditions are severe, as a material for railroad crossings on highways, and may even have advantages as a road building material. Sulfur is also quite effective in changing the acidity of the soil and thus can control such diseases as potato scab and root

Machinery for loading sulfur on ships at Galveston, Texas, capacity 600 tons per hour.

rot. It is the major active ingredient in dips and salves used to prevent goat lice, sheep and cattle scab and mange.

For the benefit of the sulfite pulp industry the Texas Gulf Sulphur Company a few years ago developed a sulfur burner, and more recently, a sulfur melter which is well adapted for universal use. The sulfur burner is of the spray type and has given satisfactory service over several years of commercial use. It can be set to give a constant proportion of sulfur dioxide gas in any amount up to 20 per cent. sulfur dioxide. It can be started and stopped almost instantaneously, and experience indicates its high efficiency. Sulfur is rather difficult to melt in ordinary equipment largely due to the fact that the solid is a very pure conductor of heat. Many ordinary melters require as high as a pound of steam per pound of sulfur melted, and even at that the capacity of the melter is very low. In the new type of melter which has been developed for the benefit of sulfur users, one pound of steam will melt 10 pounds of sulfur and the capacity is so great that more than 1000 pounds of sulfur can be melted per day per square foot of heating surface.

Industry's Bookshelf

Cyanidation and Concentration of Gold and Silver Ores by John V. N. Dorr, McGraw-Hill Book Company, 330 W. 42nd st., N. Y. City, 485 pp.

A practical description of the working of the cyanide recovery process the world over by a man who eminently qualifies to his own contributions. Flow sheets, statistical and costs data, miscellaneous tables of great value, a bibliography, make this a very complete and usable treatise which will long stand as the standard in its field.

The Principles of Biochemistry by Albert P. Mathews, William Wood & Company, Baltimore, Md., 512 pp., $4.50.

Condensed and brought up to date by complete rewriting and omission of references and laboratory exercise. This standard text (designed particularly for medical students) becomes the standard reference work on biochemistry in this country. Clarity and careful telling of both sides of many disputed points in modern theory make the work extremely valuable.

Inorganic Chemistry by Gilbert T. Morgan and Dr. F. H. Burstall, Chemical Publishing Company, 148 Lafayette st., N. Y. City, 462 pp., $4.00.

Able survey of recent developments in organic chemistry with special emphasis on radio activity, isotopes and atomic structure.

The Mathematics of Finance by T. M. Simpson, Z. M. Pirenian and B. H. Crenshaw, Prentice-Hall, Inc., 70 5th ave., N. Y. City, 330 pp., $3.75.

A new edition of a standard work which starts with the fundamental mathematical processes and goes on to their application in the study of statistics and interest, annuities, sinking funds, depreciation of book values, and so forth.

Names of the Month—

A Current Supplement to the Chemical Who's Who

BORUFF, Clair S., tech. dir., Hiram Walker & Sons, Inc.; b- Joy, Ill., 21 Sept. 1901; mar. Alice E. Waterhouse, Monmouth, Ill., 25 Dec. 1927; educat. Monmouth Coll., B.S. 1923; Univ. Ill., M.S. 1925, Ph.D. 1930. Monmouth Coll., assoc. prof. chem. 1924-28; Ill. State Water Survey, chem. 1928-30, chf. chem. 1930-34; Hiram Walker & Sons, Inc., tech. dir. 1934 to date. Author many paps. published in Jl. A.C.S. Res. on water treatment; anaerobic et al. fermentations; fermentologist; distiller. Memb., A.C.S., water sect.; Am. Bacteriologist Soc.; A.I.Ch.E. Address: Hiram Walker & Sons, Inc., Peoria, Ill.

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What the Investment Trusts Think of the Chemical Stocks

By F. A. and M. S. Hessel

CHEMICAL stocks made such a good showing during the depression and were so prompt to profit by the recovery that the investing public has become much interested in the chemical industry. Managers of the large investment trusts, however, have not yet shown real appreciation of the possibilities offered by chemical stocks. They still are a very small part in their portfolios, although some of them did invest more money last year than ever before in "chemicals."

Chemicals, which represented only about 7.7% of the total value of shares quoted beginning April 1930, had increased 10.9% beginning 1937. When we consider the great number of industries represented on the stock market the figure is quite impressive, which makes it the more surprising to find chemicals occupying a relatively small position in the portfolio of such a trust as Lehman Corporation, as shown in Table II, giving the value of Lehman's total holdings and of their chemical holdings with the percentage of the latter.

This is indeed a small percentage to invest in an industry as economically sound and financially healthy as the chemical industry, particularly so when we examine the Lehman portfolio in detail to see what proportion of their holdings are invested in other industries. This is shown in Table III which gives the approximate percentages of Lehman's total holdings in common stocks which were invested in each of the industries represented in Lehman's portfolio in '30, '32, '35 and '36.

We see at once that chemical stocks, never a leader in Lehman's portfolio, occupied a less prominent place in 1936 than ever before. However, of the eighteen industries represented in 1936 only ten have been held consistently since 1930 and chemicals are among that number. Moreover, the percentages of Lehman's total holdings in seven of those ten have varied more than the percentage represented by chemicals. Only metals and mining and railroads have been more stable.

Table III

Holdings of Lehman Corporation, Approximate Percentages

	1930	1932	1935	1936
Agricultural Machinery	..	..	..	3.5%
Automotive	1.2%	1.0%	7.7%	4.8
Aviation	..	..	..	1.8
Banking and Finance	13.5	11.3	9.5	9.1
Building and Construction	..	..	5.2	5.4
Cans and Containers	..	..	..	3.0
Chemicals	5.7	3.5	5.3	3.6
Investment Trusts	0.7	0.7	0.9	..
Foods and Beverages	12.2	7.2	8.1	2.9
Industrial Machinery and Equipment	..	..	..	6.1
Electrical Equipment	1.4	.6	2.6	..
Manufacturing, etc.	12.0	18.0	16.3	7.0
Merchandising	13.6	16.1	6.7	6.3
Metals and Mining	10.1	10.1	8.4	8.2
Office Appliances	..	..	..	0.6
Oil	4.9	4.6	12.0	13.7
Public Utilities	15.0	19.6	8.1	8.0
Railroads	6.9	4.8	4.3	5.2
Railroad Equipment	..	..	..	3.7
Steels	..	..	2.0	7.1
Tobacco	0.7	0.7	0.9	..
	100%	100%	100%	100%

Having taken Lehman Corporation as typical, we now turn to other trusts to see just what their interest in the chemical industry has been. Table IV gives the chemical holdings, in shares and money invested of six trusts for the years 1929, 1932, 1935 and 1936, showing which companies were represented in their portfolios.

Obviously, the managers of these trusts have never developed general interest in the chemical industry. Only thirteen companies are represented in the portfolios of these six trusts in 1935 and 1936, twelve in

Table I Comparative Value of Chemicals and All Stocks on New York Stock Exchange.*

	April 1, 1930	Jan. 1, 1933	Jan. 1, 1936	Jan. 1, 1937
Value of all stocks	$76,075,447,459	$22,767,636,718	$46,945,581,555	$59,878,127,946
Value of chemical stocks	5,856,519,877	1,839,695,851	5,078,983,705	6,502,233,633
% of chemicals to total	7.7%	8.1%	10.8%	10.9%

* The New York Stock Exchange classification of chemicals is more inclusive than the classification followed by investment trusts.

Table II Comparative Value of All Stocks and Chemicals Held by Lehman Corporation.

	Dec. 1930	Dec. 1932	Dec. 1935	Dec. 1936
Value of all stocks	$61,576,515	$32,851,298	$43,264,722	$54,291,505
Value of chemicals	3,500,315	1,151,437	2,284,306	1,952,259
% chemicals	5.7%	3.5%	5.3%	3.6%

Table IV

Chemical Company	Adams Express								General American							
	1929		1932		1935		1936		1929		1932		1935		1936	
	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000
Union Carbide	1,000	79	13,200	347	20,000	1,440	15,000	1,556	8,000	642	....	....	....	....	....	....
Allied Chemical	....	....	3,500	289	6,000	939	7,300	1,653	....	....	5,000	455	4,000	626	3,500	793
Du Pont	....	....	1,000	37	....	....	....	....	....	....	....	....	....	....	....	....
Air Reduction	....	....	....	....	....	....	....	....	3,000	374	....	....	....	....	....	....
Eastman Kodak	....	....	4,500	247	5,000	780	5,000	875	....	....	....	....	2,500	390	2,500	437
U. S. Ind. Alcohol	....	....	....	....	....	....	....	....	3,000	411	10,000	260	....	....	....	....
Commercial Solvents	....	....	5,000	51	....	....	....	....	5,000	156	....	....	....	....	....	....
Texas Gulf Sulphur	4,000	220	5,000	113	....	....	....	....	....	....	....	....	....	....	....	....
Mathieson Alkali	7,300	289	20,000	320	20,000	605	20,000	810	....	....	....	....	....	....	....	....
American Cyanamid	4,000	112	....	....	....	....	....	....	....	....	....	....	....	....	5,000	180
Monsanto	....	....	....	....	....	....	....	....	2,030	99	....	....	....	....	....	....
Freeport	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Industrial Rayon	....	....	....	....	....	....	....	....	....	....	5,000	147	....	....	....	....
Dow	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hercules Powder	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
United Carbon	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Atlas Powder	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sylvania	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total invested in chemicals in $000		698		1,404		3,764		4,894		1,682		862		1,016		1,410

Chemical Company	Incorporated Investors								Lehman Corporation							
	1929		1932		1935		1936		1929		1932		1935		1936	
	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000
Union Carbide	22,700	1,784	25,000	657	15,000	1,080	13,000	1,348	9,700	766	10,000	262	8,000	576	9,000	934
Allied Chemical	8,200	2,173	5,000	412	6,000	939	6,000	1,360	....	....	5,000	412	....	....	....	...
Du Pont	18,000	2,106	15,000	563	15,000	2,085	15,000	2,595	....	....	....	....	7,500	1,043	6,500	1,125
Air Reduction	9,000	1,120	12,000	724	10,000	1,680	20,000	1,560	3,000	374	2,000	120	900	151	2,700	211
Eastman Kodak	....	....	....	....	....	....	....	....	7,800	1,385	....	....	2,300	359	....	....
U. S. Ind. Alcohol	....	....	....	....	19,400	834	....	....	....	....	6,400	166	....	....	....	...
Commercial Solvents	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Texas Gulf Sulphur	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mathieson Alkali	....	....	....	....	....	....	15,000	608	....	....	....	....	....	....	...	....
American Cyanamid	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monsanto	....	....	7,000	113	....	....	....	....	....	....	....	....	10,000	900	8,800	867
Freeport	....	....	....	....	....	....	....	....	....	....	9,000	225	10,700	321	. ..	....
Industrial Rayon	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dow	....	....	....	....	....	....	....	....	....	....	....	....	6,000	579	7,500	1,013
Hercules Powder	....	....	....	....	10,000	875	9,000	1,314	....	....	....	....	....	....	....	....
United Carbon	....	....	....	....	....	....	....	....	....	....	....	....	5,000	346	5,000	426
Atlas Powder	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sylvania	....	....	....	....	....	....	....	....	....	....	....	....	....	....	200	9
Total invested in chemicals in $000		7,183		2,469		7,493		8,785		2,525		1,185		4,275		4,585

Chemical Company	Capital Administration								Tri Continental							
	1929		1932		1935		1936		1929		1932		1935		1936	
	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000	No. shares	invest. in $000
Union Carbide	4,000	316	500	13	1,600	115	1,300	136	18,860	1,490	1,000	26	4,500	324	2,500	259
Allied Chemical	....	....	....	....	600	95	600	136	1,000	265	2,500	206	3,800	594	4,600	1,041
Du Pont	500	59	500	19	....	....	....	....	6,500	760	1,000	37	....	....	....	....
Air Reduction	....	....	1,500	90	500	84	1,500	117	2,600	325	4,000	241	500	84	1,500	117
Eastman Kodak	....	....	750	40	500	78	500	88	5,300	941	4,000	219	1,000	156	1,000	175
U. S. Ind. Alcohol	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Commercial Solvents	....	....	3,000	30	....	....	....	....	7,300	227	2,600	26	....	....	....	....
Texas Gulf Sulphur	....	....	800	18	....	....	....	....	....	....	2,400	54	....	....	....	....
Mathieson Alkali	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
American Cyanamid	....	....	....	....	....	....	....	....	7,000	112	....	....	....	....	....	....
Monsanto	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Freeport	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Industrial Rayon	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dow	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hercules Powder	....	....	....	....	500	44	500	73	....	....	....	....	2,000	175	2,000	292
United Carbon	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Atlas Powder	....	....	....	....	700	34	700	51	....	....	....	....	2,500	121	2,500	183
Sylvania	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,500	64
Total invested in chemicals in $000		375		210		450		601		4,109		809		1,454		2,131

1932 and eleven in 1929, and the number of shares held by all six is very small when compared to the shares outstanding of these companies. Taking Union Carbide for an example, in 1936 the combined holdings of the six trusts were 40,800 shares, about .4 per cent. of the Carbide shares outstanding. Similarly for Allied, the other chemical company most popular with the trusts, their combined holdings in 1936 amounted to 22,000 shares or about 1 per cent. of the 2,214,099 shares outstanding. The largest percentage was in Mathieson Alkali of which two trusts held 35,000 or 4 per cent. of the total 830,428 shares outstanding.

Of the trusts Incorporated Investors, with investments in four chemical companies in 1929 totalling $7,183,000, had the largest chemical interest, followed by Tri-Continental with shares in seven chemical companies totalling $4,109,000. In 1932 Incorporated Investors, though their chemical investments had been reduced, still had the largest interest, namely stocks in five companies amounting to $2,469,000. Adams Express came second with an investment of $1,408,000 in seven chemical companies. The latter trust had more money invested in chemicals in 1932 than in 1929. All others reduced their holdings considerably.

But all showed an increase in chemical investments in 1935 when the largest interest was once more that of Incorporated Investors, holding stocks of six companies amounting to $7,493,000. Next came Lehman Corporation with stocks of eight chemical companies totalling $4,275,000. Both these trusts had increased their chemical holdings in 1936; Incorporated Investors to $8,785,000 (in six companies), Lehman to $4,585,000 (in six companies), Adams from $3,764,000 in 1935 to $4,894,000.

Union Carbide is the most popular individual chemical company among the trusts, held by six in 1929, five each in the other years. Next comes Allied, held by two in 1929 and five in all other years. Air Reduction was held by three in 1929 and by four in all other years; du Pont by three in 1929, four in 1932 and 1936, two in 1935. Eastman Kodak, the only other company's stock to be held by more than three trusts in any one year was held by two in 1929, three in 1932, five in 1935 and four in 1936. Plainly, the managers of the trusts are reluctant to branch out in the chemical industry and still confine themselves pretty closely to the "giants." This is made doubly clear in Table V which shows the percentage of the total chemical holdings of the six trusts represented by each of the chemical companies for the years 1929, 1932, 1935 and 1936.

But we must point out that last year another company for the first time represented a larger percentage than one of the leaders; since 7.5 per cent. was invested in Hercules Powder as compared with 7.0 in Eastman Kodak. The difference is small, as indeed is that between 73.9 per cent. and 73.7, mentioned above, but combined it may mean something. Particularly when we notice that in 1936 only one of the leaders represented a larger percentage than in 1935 while five smaller companies came up and a sixth was the same.

In Union Carbide over 30 per cent. of the total amount held in chemicals was invested by the six trusts in 1929, but it has not maintained that leadership. In both 1932 and 1936 Allied took first place. Approximately 17 per cent. of the total has been invested in du Pont except in 1932 when that stock only represented 9.5 per cent. of the total. That year Air Reduction went up from 13.2 per cent. to 16.9 per cent. but by 1936 was only 9 per cent., Eastman Kodak which represented 14.0 in 1929 has been lower ever since and in 1936 was 7 per cent.

Most spectacular has been the increased interest in Hercules Powder which did not appear in any of the portfolios in 1929 and last year was held by three of the trusts and represented 7.5 per cent. of their total chemical investing. Over a million dollars was likewise invested in Mathieson Alkali last year and in Dow Chemical.

It is gratifying that the total investment of these trusts in chemicals had increased 21.2 per cent. from 1935 to 1936 and that the figure for that year was over 150 per cent. higher than for 1932. But that year the trusts had over 50 per cent. less invested in chemicals than they had in 1929, so in spite of the large increase to $18,452,000 in 1935, the total invested in chemicals that year was only a little over 11 per cent. ahead of 1929. And the figure for 1936, $22,406,000, is not a large one when we consider the size of the six trusts.

Table V—Amounts and Percentages Invested by 6 Trusts in Various Chemical Companies

Chemical Company	1929 Amt. Invest.	1929 % Total Chem. Invest.	1932 Amt. Invest.	1932 % Total Chem. Invest.	1935 Amt. Invest.	1935 % Total Chem. Invest.	1936 Amt. Invest.	1936 % Total Chem. Invest.
Union Carbide	$5,077,000	30.6%	$1,305,000	18.8%	$3,535,000	19.2%	$4,233,000	18.9%
Allied Chemical	2,438,000	14.7	1,774,000	25.6	3,193,000	17.3	4,983,000	22.2
Du Pont	2,925,000	17.7	656,000	9.5	3,128,000	17.0	3,720,000	16.6
Air Reduction	2,193,000	13.2	1,175,000	16.9	1,999,000	10.8	2,005,000	9.0
Eastman Kodak	2,325,000	14.0	506,000	7.3	1,763,000	9.6	1,575,000	7.0
U. S. Industrial Alcohol	411,000	2.5	426,000	6.1	834,000	4.5	......	..
Commercial Solvents	383,000	2.3	117,000	1.5	......	..	......	..
Texas Gulf Sulphur	220,000	1.3	185,000	2.7	......	..	......	..
Mathieson Alkali	287,000	1.7	320,000	4.6	605,000	3.3	1,418,000	6.4
American Cyanamid	224,000	1.4	......	..	......	..	180,000	.8
Monsanto	99,000	0.6	113,000	1.6	900,000	4.9	867,000	3.9
Freeport	......	..	225,000	3.3	321,000	1.7	......	..
Industrial Rayon	......	..	147,000	2.1	......	..	......	..
Dow Chemical	......	..	......	..	579,000	3.1	1,013,000	4.5
Hercules	......	..	......	..	1,094,000	5.9	1,679,000	7.5
United Carbon	......	..	......	..	346,000	1.9	426,000	1.9
Atlas	......	..	......	..	155,000	0.8	234,000	1.0
Sylvania	......	..	......	..	......	..	73,312	0.3
	$16,582,000	100%	$6,939,000	100%	$18,452,000	100%	$22,406,000	100%

The Sale of Chemicals

Under the Robinson-Patman Law

By Richard C. Hedke
Eaton-Clark Co.

Far from being eliminated as some thought he would be, the local chemical distributor today occupies a more important and a stronger place in chemical distribution than at any time since the World War. No chemical distributor in this country is more widely known or more highly respected than the manager of the chemical department of the old firm of Eaton-Clark in Detroit. Richard Hedke, golfer, Rotarian, father of four girls, and chemical sales manager extraordinary, celebrates this year the thirtieth anniversary of when he joined as a cub salesman the staff of the firm of which he is now vice president. Energy, responsibility, alertness, and sales opportunities are his characteristics, and he knows the problems of chemical distribution from A to Z.

FOR years the high costs of selling have been held up before American businessmen as a sort of disgraceful opportunity. Reformers have railed against the great difference in cost to the maker and price to the consumer. Economists have pointed to this spread as proof that production technique has outstripped distribution methods. Practical executives have labored to increase distributing efficiency as a most likely way of increasing profits.

Within the past few months, thanks to the Robinson-Patman law, American industry has been forced to learn a great deal about these costs of distribution. If price differentials may only be based upon actual differences in selling costs, it is obligatory to know exactly what those costs are.

This new knowledge of costs is sometimes quite startling. Always it is instructive, and we have already learned enough to be able to draw a few fairly definite conclusions.

Most efforts to lower distribution costs have been directed towards larger volume. This has been notably true in the chemical industries. Experience in our plants has emphasized the savings effected by large outputs. By simple analogy our sales departments have easily carried over this production experience. The cry has been for volume, more volume, even more volume.

It is a shock therefore, to discover that, generally speaking, a great deal of the industry's big tonnage business has been sold too cheaply. It is not such a surprise to learn that very small quantity orders have often been unprofitable because the differentials charged do not cover the expenses of selling, order entering, packaging, and delivery. But knowledge that both very big and very little orders have been filled too cheaply is going to have quite an effect upon some of our time-honored methods of selling chemicals.

Obviously the first reaction is to scale down the discounts for larger quantities and to raise prices on l/c/l packages to cover the larger costs. Since differentials must be justified in court upon actual differences in selling cost, this tightening up of the price schedule is logical and can be justified. This will naturally lessen the temptation to change price schedules except on real savings in manufacturing costs. Such savings are today mainly the result of improved manufacturing processes or lower priced raw materials. Accordingly, the tendency is to stabilize chemical prices to the advantage alike of the chemical producer and the industrial consumer. Both have long since learned the dangers and the difficulties of planning production programs when chemical prices are fluctuating widely.

All this is straightforward and simple enough in the case of large-tonnage, annual-contract business; but the situation is complicated in the sale of small quantities of chemicals in local markets by second-hands. Here the chemical maker is faced with three alternatives. In the choice among them he is apt to become confused by the lack of definiteness in the law which fails to recognize well established, but admittedly overlapping types of chemical dealers. If these dealers are not to be thrown into a cut-throat battle, if the smaller chemical buyers are not to be consigned to a dark jungle of competition, if in other words, the Patman law is to be administered fairly in line with its original intent of protecting our smaller, independent business units, the different types of chemical dealers should be recognized, defined, and their place in the chemical distribution system made plain.

A chemical producer seeking his share of the small-quantity business has three courses open to him.

1. He can sell his materials at a fixed price to any buyer by the carload only (or original packages only in the case of dyes, fine chemicals, or medicinals) and assume no responsibility for the less-carload price or delivery charges or credit terms. If the l/c/l market becomes a cockpit in which it is too troublesome or too dangerous to sell under the new law, this may happen. In fact some makers (naphthalene is an example) have already adopted this sales policy.

2. He can sell through his own sales staff. He can then control terms and prices so as to be sure that all transactions are within the law. This would be a thoroughly satisfactory course except that our new knowledge of costs teaches us that small orders sold and filled direct pile up very high distribution costs.

3. He can sell through local distributors. But through whom and upon what terms must depend upon the status of the various types of dealers under the Patman law.

Local chemical distributors are designated by a variety of names and they operate differently, but the following groups are easily recognized by anyone familiar with chemical selling.

A—Manufacturer's Sales Agents—firms who render both producer and consumer real sales services because they maintain spot stocks and trucking facilities to make prompt deliveries, a staff of trained salesmen covering their local territory, and often chemists rendering technical assistance to users. Chemicals are commonly shipped to them on consignment, but they assume credit responsibility though sometimes they bill in the name of their principals. They are in effect the local representatives of the chemical producer and they are paid what is virtually a commission on their sales.

B—Chemical Distributors—firms with facilities and staffs similar to the above, but differing in their connection with the producers. They buy and pay for the chemicals they sell, receiving a quantity discount (often based on the volume of business) which discount provides for their costs and leaves for them a necessary profit. Often a single firm handles some chemicals as agents and others as distributors.

C—Chemical Jobbers—individuals or small firms who maintain no stocks but fill orders out of the local warehouse of the maker or his agent or a distributor. They seldom render any technical service and yet frequently control, through friendship or special experience, considerable business. Except where producers make them special concessions, they live on commissions earned as sub-dealers.

D—Chemical Brokers—chiefly individuals who because of their intimate knowledge of sources of supply and market conditions can render expert service to consumers. They also help makers to unload excess or distressed stocks of surplus chemicals. This group, which sometimes merges in functions and activities with the so-called jobbers, is the only one whose status is clearly defined in the Patman law. Their commissions must be paid by the party in the transaction—either buyer or seller, but not by both—to whom they have rendered a tangible service.

From the end of the World War to the beginning of the depression, there seemed to be a growing question in the minds of some manufacturers, about the need of chemical distributors in the selling system. Since 1928, however, they have come back into the foreground, and it seems now that the Patman law would assure their position. That position should be clarified. The real services they render should be recognized. They should be properly paid for them.

Producers have a real stake in the less-carload market. It takes, I suppose, roughly a third of the tonnage of our total chemical output. If this market is disorganized the effect is felt adversely throughout the whole chemical price structure. It is important to us therefore, that 1/c/l distribution be decent and orderly. To throw the responsibility overboard by setting a carload price and letting the 1/c/l market take care of itself would create a chaotic condition that would help nobody.

We require a clearer classification of these distributing groups on the basis of service rendered. We need a known, fair, reasonable, legal method of paying them by discount and/or commission.

It is said that there are too many chemical dealers. Probably this is true. But it is certainly true that there are too few responsible, competent distributors. This will become even more true, if in the future, these firms are to take over most of the l/c/l merchandising of chemicals.

Firms to perform this work cannot spring up overnight. To establish such a distributing post calls for a real investment of considerable capital. To man it requires an experienced, aggressive sales staff and a trained technical staff. To manage it there must be a business leader of real executive ability, courage, honesty, and a thoroughgoing knowledge of chemical business. Organizations of this type are not mushroom growths. They grow and wax strong only with the sincere support of the whole chemical industry.

We need such distributors because they have a definite place in the economic system of distribution for the chemical industry.

Bauxite Industry '36

To supply the mineral industry promptly with data on bauxite production and markets during the past year, the following information is furnished by the U. S. Bureau of Mines. The bauxite shipped from mines in the U. S. in '36 is estimated at 369,000 long tons valued at $2,195,000. This is an increase of 58 per cent. in quantity and 41 per cent. in total value compared with '35.

Bauxite Shipped from Mines in the United States, 1932-1936*

	Alabama and Ga.		Arkansas		Total	
Yr.	Long tons	Value f.o.b. mine	Long tons	Value f.o.b. mine	Long tons	Value f.o.b. mine
'32	6,570	$40,471	89,779	$507,697	96,349	$548,168
'33	11,997	69,541	142,179	853,718	154,176	923,259
'34	12,074	71,991	145,764	1,057,062	157,838	1,129,053
'35	14,121	91,293	219,791	1,465,302	233,912	1,556,595
'36	17,000	131,000	352,000	2,064,000	369,000	2,195,000

* Shipments and values for 1936 are preliminary and subject to revision.

Import statistics for the first eleven months of '36 show that receipts from Surinam increased considerably more than those from British Guiana. Surinam accounted for 68 per cent. of the total from January to November, inclusive, '36, as compared with 56 per cent. in '35, whereas the percentages from British Guiana were 27 and 39 respectively. This shift in source of bauxite supply is due to the fact that much ore from British Guiana, formerly processed in the U. S. and reexported to Canada, is now being shipped direct to Canada.

When is a Contract *Not* a Contract

By Dr. Eric C. Kunz

Executive Manager, Givaudan - Delawanna Inc.

A buyer who is also a seller of chemical raw materials certainly knows whereof he speaks on the subject of chemical sales contracts, and this frank opinion of this keen executive will set plenty of ears aburning. Just twelve years ago fifteen of the big chemical companies' major sales executives drew up a uniform sales contract which was passed upon by about

a million dollars worth of legal talent and could not be adopted because the purchasing agents of the identical companies objected violently. This article, reprinted from the Givaudan house organ, taken with Mr. Hedke's pointed comments on chemical distributors, points out two of the storm centers of the chaotic condition of our chemical sales systems.

I SPENT a very amusing few hours the other day, looking over our company's purchasing contracts for raw materials used at our factory. All of these raw materials are products of the chemical industry: acid, alkalis, salts, phenols, etc.; in other words, they are all basic raw materials, the production of which is entirely domestic.

I was indeed amazed at the lack of uniformity which exists in these contracts which are a remarkable commentary on the biological, physiological, phrenological, and perhaps even pathological states of mind existing among those who draw up such contracts for and on behalf of their respective sales departments.

Of course, we too have our own Purchasing Contract—like all other big companies! !—but in only a few cases have we been able to "put it over" and even in those cases where we were successful, our rather simple form was covered with riders, over-riders, some initialed and others not.

It is more than remarkable how some sales managers and legal departments have contrived to transform a simple bona fide contract into a legal document between the seller and the purchaser, in which the honesty of neither is assumed to be any too good, while what normally would be called *confidence* in one another's actions is assumed to be non-existent.

The ambiguity of such contracts is evident when you consider that some of them are written for one year, while others are written for one year with the proviso that the seller is free to increase his price, should new and unexpected taxes of any kind influence unfavorably the seller's cost of production.

Some contracts provide that the seller can increase the price mentioned in the contract *every three months* . . . and others mention that the seller is at liberty to increase or "decrease" the selling price every three months. Some of the contracts reserve the exercise of that right only twice a year . . . and still others see fit to change the price agreed upon *every thirty days.* A few of them insist that the price cannot be changed during the first six months but that, after that the price may be changed.

According to some contracts, you are to be advised of a contemplated price change two weeks in advance, while other contracts stipulate four weeks' notice.

The stronger factors in the industry have done away with the customary 1% cash discount for paying bills within ten days. Other companies did not dare follow suit, while still others adhere to the ancient custom of giving an extra 1%, a custom predicated on the idea that the seller would rather see that "extra pin money" in the pocket of the dear customer than in the pocket of the broker who might be injected into the deal.

Some of the contracts utter no objection to extending the ten-day discount limit to the 10th of the following month, while others are stricter and insist on more than 10 days flat, disregarding the possibility that the treasurer might be out playing golf and thus be unable to sign the check before the deadline.

A lot more could be said about the non-uniformity of contracts on such points as protection against decline in price, whether it be your own or that arranged by your competitor, provided, however, he is responsible in the seller's opinion, or maybe in the purchaser's opinion.

Then, again, there is the question of quality. After all, no two manufacturers have equally good products; the one's must be better than the other's.

The most fascinating contracts are those which constitute *real legal documents,* covering all imaginable contingencies anticipated by the complex legal mind, involving the quality of the goods contracted for, the

method of payment, etc. These documents carefully consider possible increases in the cost of labor, taxes, raw materials, they consider possible floods, fire, strikes, and unexpected emergencies and then to top it all they make a firm provision that the sales price mentioned in the contract may be revised upward or downward at any time after a few days' notice given to the purchaser by the seller!

If you happen to have a contract like that in your Purchasing Department's files, there is only one thing sure about it: YOU REALLY HAVE NO CONTRACT AT ALL.

The situation reminds me of what a fellow said in a broker's office, back in 1929, at the time of the stock market crash, when he was completely wiped out: "They are very nice people—these brokers—they are always willing to give you an umbrella when the sun shines, but they promptly take it away from you when it starts to rain!"

Steel Analysis Modifications

Modifications of the widely used 4 to 6 per cent. chromium steels, include a molybdenum-bearing 9 per cent. chromium steel suitable for severe service in petroleum refineries and power plants. For high-pressure service, where resistance to shock and the decarburizing effect of hydrogen at high temperature is required, good results are obtained with 1.50 to 2.75 per cent. chromium, and the addition of molybdenum and vanadium. Another modification is a columbium-bearing two per cent. chromium steel. The 4 to 6 per cent. chromium steels have been modified and improved by additions of columbium or titanium. The creep strengths of 4 to 6 per cent. chromium steels containing tungsten or molybdenum, used for condensers and tubing in oil cracking, are improved when columbium is added.

Addition of columbium or titanium is responsible for much improvement in the properties of many chromium-nickel and straight chromium steels. The prime function of columbium is to control the carbide constituents of chromium steels. There have been many possible applications in which plain chromium steel would have proved exceedingly useful had its air-hardening characteristics been modified or eliminated. Columbium is very effective in overcoming or modifying these properties in these steels, including the high-chromium stainless type. In the past year columbium-bearing chromium steels have aroused much interest and favorable comment, especially among those who are interested in products fabricated by welding.

Columbium is used in 18-8 chromium-nickel stainless steel welding rods, and either columbium or titanium in the stainless base metal to inhibit any tendency toward intergranular corrosion that might otherwise be present in or near welds. The amount of columbium added is determined by the carbon content of the steel and by the temperature at which it is to be used. With correct amounts of columbium in these steels it is not necessary to anneal structures fabricated by welding in so far as obtaining freedom from intergranular corrosion is concerned.

Among the important modifications of the straight chromium, oxidation-resistant steels is a new heat-treatable alloy containing 16 per cent. chromium and one per cent. nickel. This corrosion-resistant alloy is heat-treated after fabrication and is used in airplane construction.

Still new to many is the 18-8 type of chromium-manganese steel which, however, has been successfully used in a limited number of applications for several years.

The analyses of many heat-resistant steels containing 20 to 35 per cent. chromium have also been modified. A new alloy containing 35 per cent. chromium and seven per cent. aluminum has recently been announced as suitable for continuous service at 2,300° F.

Another important modification of the high-chromium steels is the addition of nitrogen to improve the grain structure. Steel castings containing over 20 per cent. chromium have been in use for many years in applications where resistance to corrosion, to high temperatures, and to excessive wear is desirable. Such castings tend toward the formation of a large grain structure and toward grain growth when held at a high temperature for very long periods. The addition of nitrogen to such alloys has the effect not only of reducing the tendency to grain growth at high temperatures, but also of refining the grain. This results in a marked increase in the ultimate strength, yield point, elongation, and reduction of area. The nitrogen is added in the proportion of approximately one part of nitrogen to 120 parts of chromium. It is introduced in the form of high-nitrogen ferrochrome.

While the uses of nitrogen and columbium in chromium steels are being tried out in many industries with a view to wider application, the utilization of many new modifications of chromium steel is very extensive. The wider application of chromium steels, a greater variety of commercial ranges of chromium content, and modifications to include nitrogen, columbium, titanium, molybdenum, aluminum, nickel, or tungsten, depending upon the application, are very definite trends.

Synthetic Resins Classified

By Dr. W. H. Krumbhaar

A—Phenolic.

1.—Straight Phenolics.

a. Made by condensing di-alcohols with formaldehyde. The oil reactivity of these resins is indicated by the excessive foaming which occurs when making varnishes with them.

b. Non-foaming. Formaldehyde is not used. Phenol is combined with terpenes or similar substances. These resins retard gelatinization of wood oil and, despite non-foaming, are oil reactive.

2.—Reduced Phenolics.

a. Reduced with ester gum. Value of resins depends not only on quantity of phenol used but also on the type of phenol.

1. Low phenol content giving low melting point.
2. High phenol content giving high melting point and high viscosity. Toughness of resin is indicated not necessarily by high melting point, but by high viscosity in solution.

B—Maleic Acid Type.

This type is really alkyd, since it contains di-basic acid. Has very good light resistance and compatibility with nitrocellulose lacquer.

1. Low content of maleic acid.
Low melting point—low viscosity.
2. High content of maleic acid.
High melting point—high viscosity.
3. Modified with esterified copal.
Used in rubbing varnishes and printing inks.

C—Alkyds.

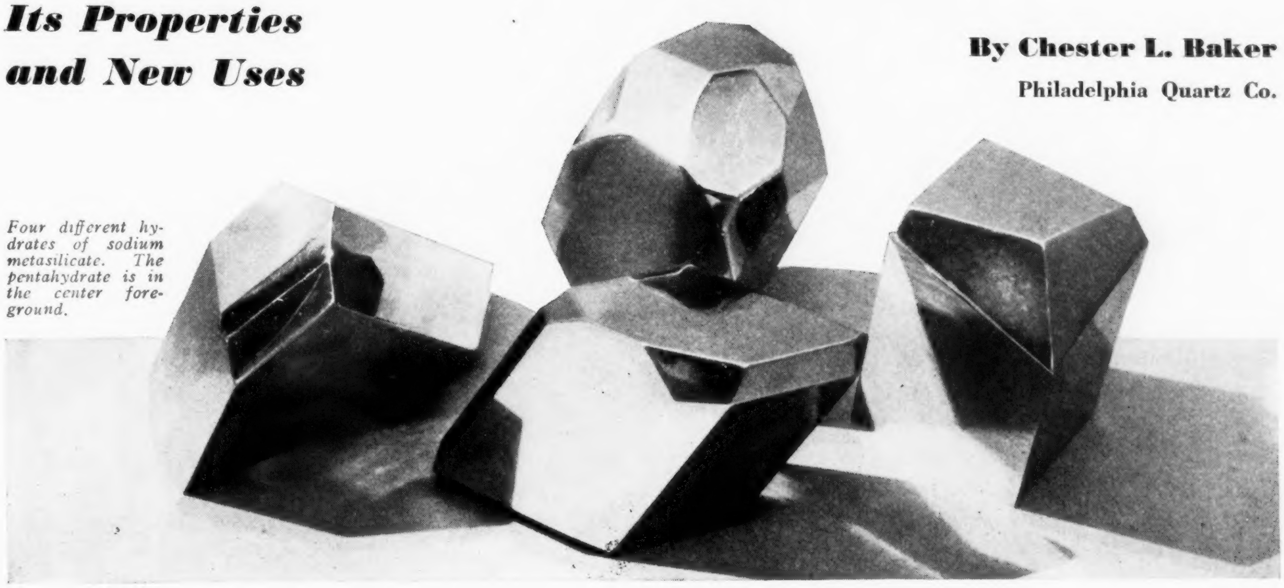
Glycerine—Phthalic anhydride with oily components.

1. Modified with non-drying oils, castor oil and cocoanut oil for plasticizer. Used in lacquer.
2. Modified with semi-drying oil, soya bean oil used in making varnish for high baking white refrigerator enamel.
3. Modified with drying oils, linseed, perilla, wood and fish oils.
4. Phenol modified alkyds.
a. Short oil type. b. Long oil type.

Sodium Metasilicate

Its Properties and New Uses

By Chester L. Baker
Philadelphia Quartz Co.



Four different hydrates of sodium metasilicate. The pentahydrate is in the center foreground.

SILICATES of soda constitute one of the most diversified groups of commercial chemicals. There are crystals and glasses, solids and liquids, solutions so viscous that they will hardly flow and others nearly as fluid as water; there are free-flowing powders whose particles are really liquid. This array of commercial silicates of soda can be divided into two principal groups. The first, which represent most of the commercial tonnage, are characterized by the fact that their chemical composition is partially independent of the laws of valence. For example, one widely-used grade might be represented by the empirical formula $Na_2O.3.22SiO_2.24.21H_2O$. The second group represents the crystalline sodium silicates. These are true chemical compounds and have characteristic crystal habits. Of these sodium metasilicate pentahydrate ($Na_2SiO_3.5H_2O$) is commercially the most important.

Ten years ago sodium metasilicate was a chemical curiosity. Sticky crystals with a bad habit of cementing themselves into rock-like masses were available from one or two laboratory supply houses at a dollar a pound or more, and the use of the material was confined to infrequent bits of research. Today there is available a dry, stable, and free-flowing product of high purity, selling in carload quantities at less than two and a half cents per pound. It has become a basic alkali of unusual detergent properties and widely used in laundries, textile mills, dairies, bakeries, metal fabricating plants, and in many other industries where cleanliness at a low cost without injury to the material being cleaned is important.

Sodium metasilicate was first reported by Fritzsche in 1838. He described the six-hydrate ($Na_2SiO_3.6H_2O$) and the nine-hydrate ($Na_2SiO_3.9H_2O$). Later workers claimed to have prepared the salt with two and a half, three, four, six, seven, eight, nine, ten, twelve, and fourteen molecules of water of hydration. The controversy seems to be settled now with the work of Baker, Woodward, and Pabst (American Mineralogist *18*, No. 5, 206-15, 1933), who found, after an exhaustive investigation, only four hydrates. The characteristics of these hydrates are given in the table below.

Compound	Crystal System and Class	Density at 20°C.	Mean Index of Refraction	Melting Point
$Na_2SiO_3.5H_2O$	Triclinic pinacoidal	1.749	1.456	72.20°C.
$Na_2SiO_3.6H_2O$	Monoclinic sphenoidal	1.807	1.474	62.85
$Na_2SiO_3.8H_2O$	Monoclinic prismatic	1.672	1.462	48.35
$Na_2SiO_3.9H_2O$	Rhombic bipyramidal	1.646	1.455	47.85

The detergent value of the more silicious, semi-colloidal grades of silicate of soda was tacitly recognized by industry as early as 1864 when the practice was adopted of incorporating it in bar soaps. This continued use for over seventy years bears testimony to its utility. As detergent action became better understood, ample scientific evidence was produced to establish the detergent value of the silicates of soda. Their use as independent detergents, however, was impeded by the fact that they were too mild in their action for many uses and because the user wanted a quickly soluble powdered product. The crystalline sodium metasilicate seemed to offer the solution to these problems, but many difficulties lay in the way.

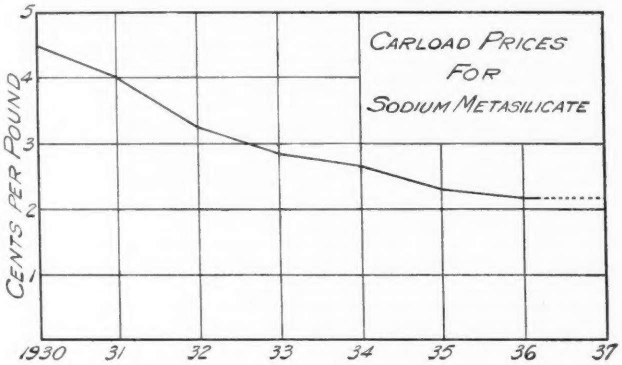
Early attempts to manufacture sodium metasilicate economically and in acceptable form met with repeated, heart-breaking failure. The material invariably hardened in the barrel. Material of a loose, free character would, upon a few days' storage, be metamorphosed into a hard, shrunken mass, defying both chisel and sledge. Twice the problem was considered solved, but the

product was found unstable under certain storage conditions. Finally, it was discovered that if a solution were prepared which had the same chemical composition as the desired product and if this solution were treated in a particular manner it would crystallize to a hard cake which could be ground. This ground material, at last, was found to remain dry and free-flowing under storage for an indefinite period of time. The process and product have since been protected by U. S. Patent No. 1,898,707. The five-hydrate made under this process is sold under the trade-name of "Metso Granular."

Since this first success two other crystalline sodium silicate products have been developed and placed on the market. Sodium metasilicate pentahydrate in the form of discrete crystals, separated from a mother liquor, is slightly purer than the granular material and hence better adapted to certain work. The salt which has been named sodium sesquisilicate ($Na_3HSiO_4 . 5H_2O$) has been discovered, a satisfactory manufacturing procedure worked out, and the product placed on the market. These two products are sold under the trade-names of "Metso Crystals" and "Metso 99," and are protected by U. S. Patents No. 2,017,561 and No. 1,948,730, respectively.

Sodium metasilicate is marketed almost exclusively as the pentahydrate, the most concentrated form of this salt which is readily soluble. The white, granular product is usually screen-sized to pass a ten-mesh sieve and to be retained on a sixty-five. For prolonged storage under warm, humid conditions it is advisable to pack in tight steel drums but, under most conditions prevailing in this country, this precaution is not necessary. The standard package is the three-hundred pound, tongued and grooved stave wooden barrel. Fifty and one-hundred pound plywood drums as well as metal containers carrying three hundred and fifty pounds, one hundred pounds, and fifty pounds are also available.

From the first the Philadelphia Quartz Company has taken the attitude that sodium metasilicate should not be classed as a specialty chemical, but should rightfully be treated as a basic commodity. The market price of the material has reflected this attitude. The introductory price was much lower than would normally seem consistent with the high costs of small-scale production and introduction to the market. As quantity production got into swing, the price has further decreased until it now seems to have reached about the basic level.



Sodium metasilicate pentahydrate melts in its own water of crystallization at 72.2° C. to yield a clear, viscous solution which has small tendency to re-crystallize, especially if quickly cooled to room temperature. It is easily and completely soluble in water, fifty pounds dissolving in one hundred pounds of water at room temperature. It is slightly hygroscopic but, as weather conditions prevail in the eastern part of the country, it will remain dry and free-flowing in contact with the relatively dry winter air. On moist summer days, unless it is covered, it will absorb enough moisture to become damp. On the whole, it is probably less trouble-

Use of sodium metasilicate in a laundry wash-room.

some in this respect than caustic soda and reasonable precautions will insure its remaining in good condition.

Since silicic acid is relatively weak, solutions of sodium metasilicate are strongly alkaline. They have a higher pH than solutions of sodium carbonate or sodium phosphate of the same concentration. The Na_2O in sodium metasilicate solutions can be largely neutralized without the pH of the solution falling below 10.0. In other words, the Na_2O in metasilicate is largely available for useful work at effective levels. This is one of the reasons that it is more valuable as a soap aid than several other alkalies which carry a higher percentage of total Na_2O.

Solutions of sodium metasilicate form precipitates with all di- or polyvalent metallic ions. This is particularly advantageous in washing solutions with soap, as it tends to protect the more expensive soap against precipitation by calcium and magnesium hardness in the water. The silicious precipitates formed are light and flocculent and have less tendency to adhere and build up on solid surfaces than do the precipitates formed by sodium carbonates or hydroxide. Many of the metallic silicates can be most conveniently prepared by precipitation from solutions of sodium metasilicate, and this method may eventually yield useful new commercial products.

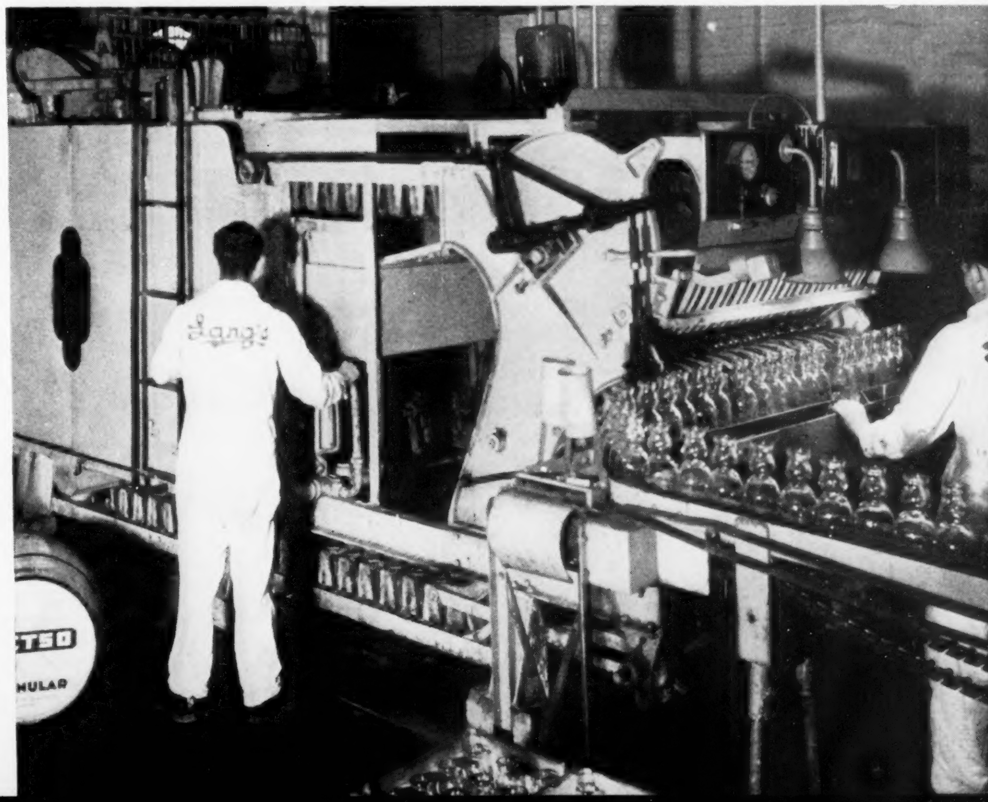
Silicate of soda solutions as a class are unique in that the soluble silica present tends to protect soft metals against alkali attack. They attack tin or aluminum surfaces much less than do other alkalies. This is true whether the comparison is made at equal concentrations, pH levels, or temperatures (*Ind. Eng. Chem. 27*, 1358-64, 1935). Thus it is possible to establish conditions for cleaning these metals with sodium metasilicate which are more effective and less injurious than with other alkalies. Sodium silicate in some form is the characteristic constituent of nearly all alkaline aluminum cleaners. Sodium metasilicate is the safest and most generally satisfactory cleaner for the expensive tinned surfaces found in dairies, bakeries, and other food-handling plants.

Dilute solutions of sodium metasilicate have a power for wetting surfaces and emulsifying oils which adapts them well to detergent work where a surface must be uniformly wet and cleaned. The preparation of textiles for level dyeing and metals for electro-plating are cases in point.

Sodium metasilicate is a useful deflocculating agent. A clay paste can be reduced to the consistency of thin cream by the addition of a few tenths of a per cent. of the salt. Closely related phenomena probably explain its ability to soften and stably suspend finely-divided soil in washing processes.

Carter (*Ind. Eng. Chem. 23*, 1389, 1931) has proposed that in detergent work it is just as important to prevent the soil from re-attaching itself to the surfaces being cleaned as it is to remove the soil in the first place. The protection afforded by sodium metasilicate in such a situation is truly surprising and can be easily demonstrated by a simple experiment. One bottle is half-filled with water and another with a 0.4% solution of sodium metasilicate. About 1% of dry, finely-ground iron oxide pigment is then added to each, and thoroughly shaken in. Next, a small piece of unsized white cotton cloth is wet with water, then immersed and shaken with the suspension. Upon removal and rinsing, the piece that was in the metasilicate solution will be found to be only slightly stained, while the piece from the other bottle will be colored deep red. The superiority of metasilicate over the other common alkalies can be demonstrated by similar experiments.

The properties of sodium metasilicate especially adapt it to detergent work, and its present industrial usage is



Milk bottles washed with sodium metasilicate.

confined largely to this important field. While the number of separate and distinct applications are legion, only a few of the more important will be mentioned. It has come to be regarded as an outstandingly superior laundry detergent. It differs from other alkalies used for this purpose in at least two important respects. First, it tends to hold or buffer the wash solutions at a pH of from 10.5 to 11.5, where a given amount of work can be accomplished with less soap. Second, it has important detergent powers of its own which are not possessed by the non-silicious alkalies. Its power to prevent the redeposition of soil is a good example. Metasilicate-washed clothes are well-known for their bright, snappy appearance. Sodium metasilicate in the laundry is invariably used in connection with soap. The proportion of metasilicate to soap required will differ but, on the average, about three quarters of a pound will be required per pound of soap used, and these quantities will wash from one hundred to two hundred pounds of clothes.

In dry cleaning an organic solvent is used, but the finely divided mineral matter, fats, soaps, and other soil picked up from the clothes in the dry cleaning process must be removed from the solvent before it can be used again. This is effectively and quickly accomplished by bubbling the used solvent through a 10° Baumé solution of sodium metasilicate. A solution of sodium sesquisilicate may also be used.

In dairy plants sodium metasilicate has proven useful in maintaining scrupulous physical and biological cleanliness. It quickly dissolves casein and milk albumin, saponifies fats and precipitates the ever-present calcium in a non-adherent form which can be flushed away. The high wetting power helps to eliminate that last film of soil which is likely to harbor bacteria. Plants using metasilicate are usually free from that troublesome, heat-hardened incrustation known as milk stone. Tinned equipment is less likely to be attacked and require costly re-plating. It has been shown that metasilicate added to caustic soda solutions used in bottle-washing increases their bactericidal power more than any other alkali. For washing dairy equipment it is customary to use solutions containing from one-half to three pounds per one hundred gallons of water, depending upon the particular piece to be cleaned.

Metasilicate is widely used in bottle-washing machines. Here it has been found more practical, due to the lubricating effect of caustic on the machine, to charge the first soaking tanks with a solution of caustic soda and use metasilicate only in the last wash tank. This final bath facilitates the removal of that last thin grease film, assists rinsing, and assures the bright, sparkling glass surface characteristic of metasilicate-washed bottles.

Many other food-handling and preparing plants find use for metasilicate. Bakers' pans, meat-cooking vats, floors, and miscellaneous equipment are effectively cleaned. A difficult and touchy job satisfactorily performed by metasilicate is that of removing grease from filled fish and meat cans without etching the tin. Hotels and restaurants find that metasilicate in their dishwashing machine gives that much-desired luster and sparkle to their tableware.

The increased use of electroplated parts has created a most difficult class of cleaning problems. Prior to plating, the surfaces must be absolutely freed from all dirt, grease, and oil, some of which, intentionally introduced in the pre-fabricating processes, is extremely difficult to remove. Furthermore, the surfaces must be guarded against the formation of any trace of oxide film or chemical attack. Sodium metasilicate has proven a valuable cleaning agent for such work. Solutions carrying from three to five ounces per gallon, with sometimes a little rosin added, are commonly used.

Sodium metasilicate has some unusual applications. In concentrations of one tenth per cent. it is used to thin oil well drilling mud, at higher concentrations to thicken it. It facilitates the removal of hair from hogs when used in the scalding water. As an automobile radiator cleaner in a concentration of about one ounce per gallon it gives good results and tends to inhibit rusting. Tripe washed with metasilicate is whiter and cleaner. It has been used to remove the acrid substances always present in uncured olives, yielding a product with a better flavor, probably because less of the oil was removed. It has been proposed to use it to remove the skins from peaches before canning, and in the washing of raisins. It has found some use as a paint stripper, and it has been claimed that it is the best available material for removing propolis.

Fabricators of industrial cleaners have found sodium metasilicate a desirable alkali foundation from which to build their special detergent compositions. Most other detergent materials are compatible both in the dry state and in solution. Soaps, caustic soda, trisodium phosphate, soda ash, rosin, calcium sequestering agents, the sodium sulfonates of the higher alcohols, as well as other wetting agents are a few of the substances which have been admixed with metasilicate.

Asbestos Industry in '36

Domestic production of asbestos amounted to 10,845 short tons in '36 compared with 9,415 tons in '35, an increase of 15.2 per cent. Quantity sold or used by producers in '36 (11,012 tons valued at $309,994) increased 23.5 per cent. in quantity and 5.8 per cent. in value over '35 according to a report from the U. S. Bureau of Mines. Most of that sold was short fiber chrysotile from Vermont. Amphibole asbestos was mined in Maryland, Montana, and North Carolina.

Imports of unmanufactured asbestos amounted to 243,602 tons valued at $7,524,937, a gain of about 46 per cent. in quantity and nearly 47 per cent. in value compared with '35. Exports were 3,744 tons valued at $310,197. Apparent consumption in '36 (domestic fiber used plus imports, minus exports) was 250,870 tons valued at $7,524,734, a gain of 43.6 per cent. in quantity and 41.2 per cent. in value over '35. The value of exports of asbestos products increased 9.6 per cent.

Plant Operation and Administration

Interior view of large beer storage tank coated with a special finish formulated with Bakelite resin by the Lithgow Corp.

A Digest of New Methods and Equipment for Chemical Makers

A Continuous Process for Alkali Cellulose

By Herbert Fischer

EXPERIENCE has shown that it is necessary to handle cellulose with the utmost care during the process of manufacture. Any mechanical or chemical action on the cellulose fiber, beyond that absolutely necessary, is undesirable, since it affects the quality of the synthetic products manufactured from the cellulose solutions, especially staple fiber. For instance, it has not yet been possible to produce a material from wood cellulose according to the cuprammonium process equal in quality to that made from cotton linters. It follows that from the so-called "native" cellulose fiber, which is less affected in the conversion process, a synthetic product of greater resistance can be obtained than that made from the fiber isolated from wood. Therefore in subsequent stages of manufacture, when treating the cellulose fiber obtained from wood, every possible precaution should be taken. For the disintegration of the cellulose caused by rough treatment of the fiber increases the primary swelling of the material for the filament, which, however, is an evil that may be remedied to a certain extent by a change in the aging conditions of the alkali cellulose. (See H. Soyer, *Rev. Univers. Soie Text. Artif.* 11, 1/29/36).

Mechanical injury of the raw material is also seen in that the required viscosity of the solution made from it is lowered, for the material which has been subject both before and after the disintegration to the least mechanical influence is the one which always has the highest viscosity. (See S. Schmidt-Nielsen, Norweg, Techn. High School, Lab. D., 1934).

The work of Staudinger has led to the discovery that cellulose is composed of macro-molecules and that there exists not only one cellulose, but that there are many types having chain molecules of the same structure, but of different lengths. The differences of the various kinds of cellulose, especially their different strength and also the different viscosity of their solutions, have to do with the varying lengths of their macro-molecules. Under chemical treatment, the long macro-molecules of cellulose are extremely easily degraded, and it is important therefore to carry out the technical stages in such manner as to prevent the degradation as far as is possible. For instance, in boiling the sulfite pulp the necessary quantity of bleaching agent is considerably decreased by the use of a non-oxidizing pressure gas, permitting a shorter period for boiling. Air is not suitable because its oxygen content has an unfavorable effect upon the quality and increases the cost of bleaching. (See *Industritidn*, Norden, 63, page 193, Volume 1935).

In attempts to simplify the alkali cellulose manufacturing process, and particularly to shorten it, it was necessary as far as possible to avoid any oxidation. In every case in which an injurious effect of the atmospheric oxygen upon the cellulose was determined, it was exclusively a matter of reaction in the presence of alkali, and it was found that the active oxygen, that is, hydrogen peroxide, in the alkaline medium has no effect upon cellulose, while the elementary oxygen, in itself different, causes degradation. (See Dr. E. Scheller, *Melliand Textilberichte*, 1935, page 176.)

The facts thus established have paved the way for the alkali process as described in the German Patent No. 604,013. Contrary to the usual manner of cutting the pulp in sheets and of working them up as such, the pulp is used in very long strips rolled up on rollers. Several of these strips are laid one upon the other and run simultaneously and continuously through a dipping vat filled with the usual mercerizing lye. The speed at which the pulp strips are passed through the vat depends of course upon the length of the vat and upon the time prescribed for dipping. Experience has shown that the usual dipping time of from 90 to 120 minutes could be considerably cut down,—to as little as 25 minutes. The lye flows in continuously from the opposite end, so that the cellulose on its way through the dipping vat is always subject to the same conditions, and the removal of the hemicellulose is greatly aided.

At the end of the dipping vat there are several pressure rollers by which superfluous lye is squeezed out. By regulating the pressure of the rollers, accomplished by adjusting the distance of the rollers from each other, it is possible easily to squeeze out the lye to about three times the pulp weight which is the general practice. The lye flowing off from the pressure rollers can be caught up separately and regenerated in the usual manner.

Precautions in Aging

Tests were made to eliminate as far as possible the action of atmospheric oxygen during the subsequent aging process, namely by carrying out the preliminary aging while the cellulose is still in strips, instead of in the usual way when it has been milled. By this method only a relatively small surface is subjected to the action of the oxygen, because the surface of the cellulose strip obviously comprises but a fraction of that surface which otherwise is exposed to the air by the milled alkali pulp. It was therefore possible without incurring any risk to increase considerably the temperature in the preliminary aging, and thereby to shorten that process to six hours, obtaining precisely the same results as with the ordinary process. The constants of the synthetic fiber thus produced remained the same, while on the other hand it appeared that with milled alkali pulp an increase of the temperature in the preliminary aging led to difficulties as regards solutions and filtration. Because of this it was possible to permit the alkali cellulose issuing from the pressure rollers to run in strips directly into an aging chamber at a speed adjusted for an aging period of six hours, whereby the atmospheric temperature is raised to 50° C. The action of the atmospheric oxygen is still further reduced by the circumstance that only a certain quantity of air is permitted to circulate inside the aging chamber, that is to say, fresh air from outside is only allowed to enter in limited quantities through the openings that are unavoidable for other purposes. It is of course necessary to regulate the moisture of the air in the aging chamber in such a manner as to prevent the strips from drying out.

Following the continuous alkalizing process, the shredding of the alkali cellulose takes place, also as a continuous process. The machine, which was arranged for milling in batches, is no longer used. Another machine was chosen which with continuous loading turns out alkali cellulose immediately in its final degree of fineness. The machine consists mainly of a strong cast iron encasement into which is built the drive either for a horizontal or a vertical cog wheel. The lid of the machine is formed by a second cog wheel, the cogs of which fit into those of the rotating wheel. In the center of the stationary milling wheel there is an opening through which the alkali cellulose is fed. The cellulose is caught by the rotating lower wheel and driven outward by the cog wheel by centrifugal force, leaving the machine in a degree of fineness which can be altered at will by regulating the distance between the two wheels. The milling wheels are arranged for either water or brine cooling, for the purpose of preventing a rise of temperature during the milling process. However, any rise in temperature is necessarily very slight, since the passage of the cellulose through the machine takes only a few seconds, leaving no time for heat to develop.—*Rayon Textile Monthly*, p47, April, '37.

Preparation of Chrome Tannages

Study of the chemical properties of commercial chrome tanning powders with regard to effect of temperature of solution and time of aging the solution upon the particle size, degree of olation, free acid, ionic sulfate and upon the tanning properties of these solutions, reveals:

1. Immediate solution of the extract yields chromium complexes with large particle size, low free acid, high complex sulfate, and relatively low olation.
2. Solutions of this type used to tan pickled hide substance cause extraordinary high degree of chrome and sulfate take up, high fixation in all probability caused by the large particle size.
3. Increased temperature and increased time of aging of the solution causes the particle size of the chromium complex to decrease considerably. This also induces formation of more ionic sulfate and higher degrees of olation. Smaller particle size causes a lesser chromium and sulfate take up of hide substance.
4. Aging solutions of the extract cause uniformity of the free acid, olation complex sulfate, and particle size content of the liquor regardless of the initial temperature.
5. A temperature of solution of 80° C. appears to be critical inasmuch as temperatures of olation greater than this cause slight effects which may be considered the reverse of that occurring with increase of temperature up to 80° C., *i.e.*, above 80° C. solution causes a slight increase in particle size and complex sulfate content of the chrome liquors.
6. The results of the present work confirm to a great extent the theories of Stiasny, Schindler and others concerning the increased tanning properties of large chrome complexes and complexes high in ionic sulfate.—E. R. Theis, E. J. Serfass, and E. J. Weidner, *Jl. Leath. Chem. Assn.*, p166, XXXII, 4 (Ap. '37).

Effect of Heat on Fatty Acids

Change in viscosity of fats with the temperature is to a certain extent dependent upon the molecular weight, the content of oxy acids and the degree of polymerization and oxidation. Table by G. B. Rawitsch gives the variation of viscosity with temperature, reported in centipoise as found with the Ubbelohde glass capillary viscosimeter.

	0°C.	15°C.	20°C.	30°C.	40°C.	50°C.	60°C.	70°C.	80°C.	90°C.
Sunflower Oil, hydrogenated ..	solid					32.7	23.9	17.6	13.4	10.5
Sunflower Oil natural ..		80.0		38.0	26.7	20.4	14.8	11.4	9.2	7.4
Linseed Oil	118	55.0	47.0	32.0	23.0	17.7	13.4	10.4		
Cotton Seed Oil	86.0		69.2	42.0		21.6	16.0	11.6	9.4	7.5
Seal Oil ..		70.2		36.8	24.8	18.2	13.6	10.8	8.9	7.0
Dolphin Oil					26.7	20.0	14.9	11.4		

In comparing the iodine value of vegetable oils (with exception of castor oil) with the viscosity, a certain relationship is noticed. The viscosity decreases with increasing iodine value.—*Kolloid Zeit.* 76, 341 ('36).

Treatment for Belts and Pulleys

A material consisting solely of rubber in fluid condition with only sufficient neatsfoot oil to maintain fluid condition while on the belts and counteract the presence of oil and other belt deteriorating matter which may contact the belts while in use, the rubber and neatsfoot oil being present in the approximate proportions of 13 parts of rubber to 1 part of neatsfoot oil, is covered by U. S. Pat. 2,001,582.

The I. C. I. Sulfur Recovery Processes

Sulfur recovery process developed at Billingham works of I.C.I. has reached commercial stage, being applicable to metallurgical gases of almost any SO_2 content, as well as capable of reducing SO_2 content of such gases below the limit of concentration at which they are a nuisance. Its first stage alone it can be employed to give concentrated sulfur dioxide for liquefaction and sale. An experimental pilot plant has been in intermittent operation for several years, and is now in continuous production of about 20 tons of SO_2 gas per day. A reduction plant having an output of 5 to 6 tons of sulfur per day is also in production.

Several factors prompted study of the problem of dealing economically with waste sulfurous smelter gases. One was the economic value of the sulfur wasted in this way throughout the world, totalling two million tons per annum. National self-sufficiency and the necessity to abate the nuisance to health and to vegetation caused by the escape of acid gases were also considered.

Two recovery processes have been developed. One of these (the I.C.I. process) employs as a first stage a concentration process, followed by reduction of pure SO_2 to sulfur by means of coke. The other was worked out independently by Bolidens Gruvaktiebolag, of Sweden, and a company was formed last year, under the title of Sulphur Patents, Ltd., for joint exploitation and control of both procesess.

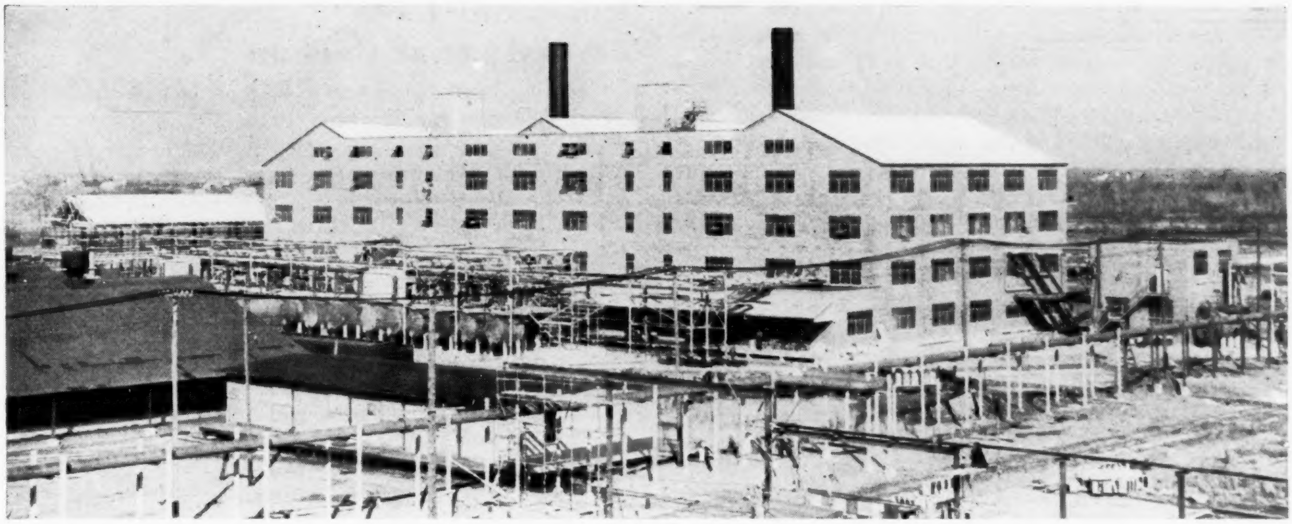
Initial research at Billingham was directed towards evolving a workable process for concentration of sulfur dioxide from the raw gases. This resolved itself into a search for a solution in which SO_2 could be absorbed in large quantities, and from which it could be readily regenerated. The choice eventually was a specially prepared solution of basic aluminum sulfate.

The Boliden process has no concentration stage, and depends upon reduction of the raw smelter gases with gases from coke. Its application is best suited to metallurgical gases relatively strong in SO_2 and low in oxygen content. Some 20,000 to 25,000 tons of high quality sulfur are produced annually at the Boliden Company's smelter at Rönnskär, Sweden, by this process. A copper smelter in Finland employs the I.C.I. process to produce 52 tons per day of liquid SO_2 from copper converter gases containing an average of 5 per cent. SO_2.

The second stage (the reduction of SO_2 to sulfur) in the Boliden process, is divided into three stages, comprising the manufacture of reducing gas, the use of this for the catalytic reduction of the SO_2, and the cooling of the gases, with separation of the condensed sulfur by electrostatic precipitation.—Abstract of lecture by M. P. Applebey, Soc. Chem. Ind. (Newcastle Sec.).

Better Chrome Green Process

In the customary process for the manufacture of chromium hydroxide green, alkali dichromate and boric acid after heating, are decomposed with water, the chromium borate formed in the reaction being decomposed to hydrous chromium oxide. A process recently patented by G. Siegle & Co., Stuttgart, Germany, makes it possible to produce a product of substantially greater transparency and darker color. Product is obtained in a higher yield and appears in a form which substantially facilitates grinding. The process comprises adding a slight quantity of elementary sulfur to the usual mixture of boric acid and dichromate. In an example given in the patent specification (E. P. 461,799) an intimate mixture of 100 grams of sodium dichromate, 11 grams of sulfur and 300 grams of boric acid are heated for one hour to 600-620° C. After heating, the still hot mass is thrown into 2 litres of water, boiled for a short time, and further washed and dried in the usual manner. About 80 grams of chromium hydroxide green is obtained.



New Chemical Plants in Construction

Summary of 1937 Plans and Buildings

Spring building is very much the fashion in chemical circles. New projects, such as the first chlorine plant in the deep South announced by Solvay; expansions, typified by the enlarged facilities at the phthalic plants of National Aniline and Cyanamid; and replacements as represented by the rebuilding of the burned acid plant of Central Chemical Co. and the lime sulfur plant of the Ansbacher-Alton people at Lyons, N. Y.—all types of construction are afoot.

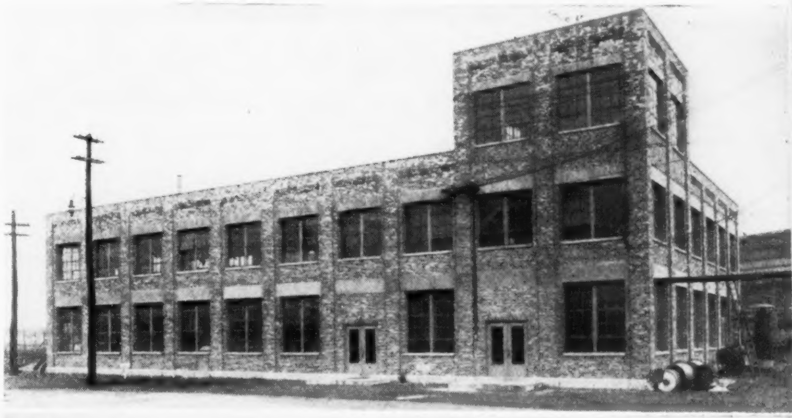
On the heels of their phosphate electric furnace near Columbia, Tenn., Monsanto is planning production of phthalic anhydride and purification of phenol on the grounds of their subsidiary, Merrimac, at Everett, Mass. The phthalic plant "with capacity to care for eastern customers" will be working next month, operated by a Monsanto staff, which is taken to indicate that other important Monsanto products will be made in New England for the seaboard market. Meantime Merrimac's own ferric sulfate plant is in production. This new building is shown at the bottom right corner of this page while immediately above it are pictures of the additional story being added to the Merrimac office building and the new laboratory.

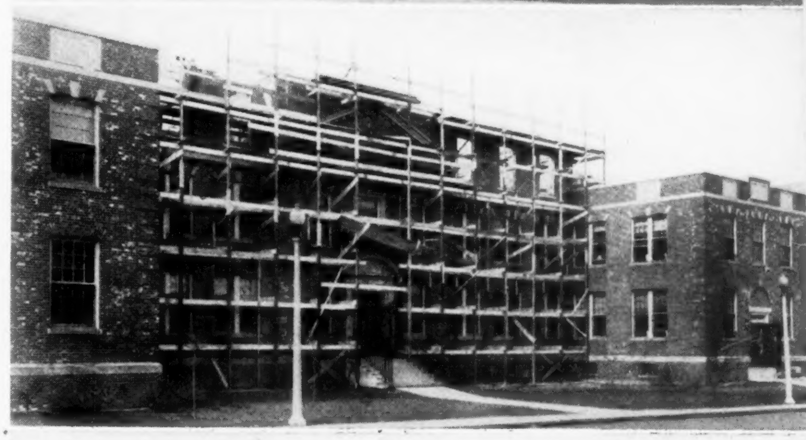
Du Pont Divisions Active

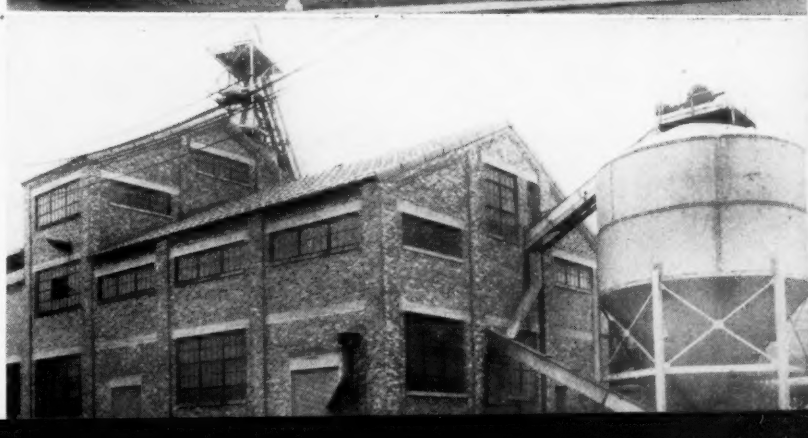
At Deepwater Point, du Pont has just completed their new Ponsol Building (shown at the top of this page) while way down at Baton Rouge ground has been broken for a million and three quarters addition to the ethyl fluid plant, which will double capacity. The Grasselli division is building a large laboratory and sales office building at Cleveland, while the Krebs Pigment division plans a new acid plant at Baltimore. Work is progressing at the new $200,000 plant begun adjoining Republic Steel's operation at Cleveland by the Reilly Tar and Chemical Co., and actual construction is under way at Stonewall, Okla. on the new plant of the Dow subsidiary, Dowell, Inc. Over $27,000,000, an increase of about a third, is budgeted by Carbide and Carbon for construction work during the balance of this year, so stockholders were told at the annual meeting; and in the chemical section this will be largely expended in expanding production of "Pyrofax" gas, a glycol.

A new plant of double interest because of location and products is the $150,000 project of the Compressed Industrial Gases, Chicago, at Bossier City, near Baton Rouge. This is this company's tenth plant and the fourth to be located in the South. It will be managed by T. L. Bramlett, now at the Tyler, Texas

Three views of the new Merrimac buildings







plant with L. H. Good, now at the Fort Smith, Ark. plant, as district manager. Bird & Son of East Walpole, Mass. are also expanding in Louisiana, spending close to $200,000 for additional facilities at their Baton Rouge site.

Plant additions recently announced cover practically every section of the country and all branches of the industry. At Tacoma, Wash. both the alkali plants (Hooker and Penn Salt) are enlarging. In Brooklyn Pfizer will errect a new fine chemical plant to cost about $250,000. Other expansions of interest are Bopf-Whittam (lanolin) at Linden, N. J.; General Aniline Co., new dyestuffs plant for $125,000 also at Linden; E. Berghausen Chemical Co., new 2-story plant to cost $70,000 at Cincinnati; an additional building for the A. R. Maas Chemical Company at Los Angeles. The carbon black field furnishes the most substantial expansion news of all in the announcement of Godfrey L. Cabot, Inc. that following the new plant at Stinnett, Tex. (just in production) additional new plants will be completed this year at Wickett and Kermit, Tex., which will increase the Cabot output by a third and which necessitates the recent order of 20 additional cars.

Expansions in Fertilizers

Better prices and demand in the fertilizer field this selling season has resulted in a number of new plants and additions to existing capacities: Ohio Farmers Grain and Supply Ass'n., new plant at Defiance; Pelham Oil & Fertilizer Co., rebuilding after fire at Cordele, Ga., Hankins Mixer Corp., leased building for new unit at Deerfield, Mich., Royster, addition costing $15,000 to plant at Toledo, Ohio. Swift, A. A. A., and Armour are all increasing or improving capacity.

A new barium reduction operation of a new company has begun construction at Rosamond, Calif. where the Western Barium Corp. is spending $75,000 for a first unit on the line of the Southern-Pacific, thus connecting by means of their own recently completed road from their mining property in Tulare Co. to that railroad. Behind this project are R. A. Fredericks, A. W. Gorman, A. S. Brotherhood, Dr. R. H. Kistler, and J. A. Gorman, all of San Francisco. Algin from Maine coast kelp will be on the market this summer from the new plant near Rockland just completed by W. H. and H. L. Betz Co. of Philadelphia. This is the first definite operation amid quite a revival of interest in this marine raw material. W. H. Gardiner who sold out his tanning materials plant at Waynesboro to the Heald interests is planning to build a new extract plant at Monterey, Va. which he expects to have in operation by autumn.

Practical Uses of Activated Carbon

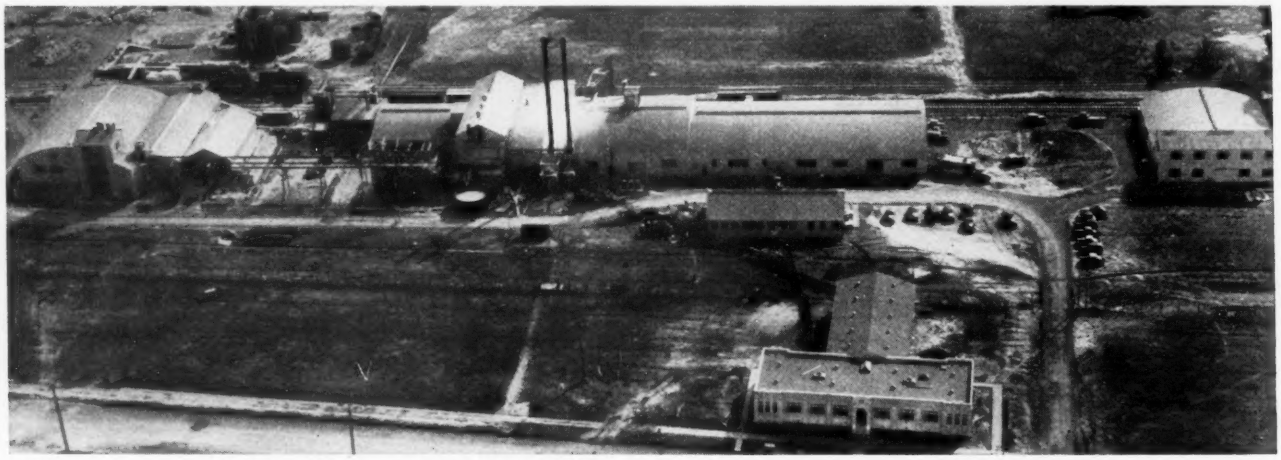
Use of activated carbon is limited to products in a liquid or gaseous condition for treatment, and is also limited to tastes or odors due to the presence of foreign bodies. It is not possible to make quinine less bitter by treatment with activated carbon inasmuch as bitterness is a physicochemical property of quinine. However, if a liquid contains quinine, then activated carbon will remove the bitter taste by actually adsorbing the quinine and removing it from the solution.

Taste and odor subject to removal by activated carbon can be put into several classes. An important class is where the complete removal of foreign taste or odor is desired, such as in the case of lard, gelatin, sugar, etc.

In gelatin, traces of animal odor may be present in even the highest grade of fresh skins, bone and other gelatin-bearing parts, and it is the regular and consistent use of activated carbon that insures the production of the neutral, taste and odor free, found on the market today. Lard, as frequently prepared, has an odor disagreeable to many people, but if treated with activated carbon it will have a neutral flavor comparable to the hydrogenated shortenings produced from vegetable oils. Other present-day commercial uses cover items such as sorghum, cane, and corn syrups, pineapple juice, pectin, vinegar, alcoholic liquors, wines, glycerin, and pharmaceutical products. Probably the best indication of its wide application is shown by its use in improving the palatability of water supplies all over the country and where every conceivable taste or odor has been encountered.—Abst. paper, A.C.S. meeting Ap. 15, 1937 by John W. Hassler.

New Method for Hexametaphosphate

Growing use of sodium hexametaphosphate (Calgon) in treatment of boiler feed-water, in laundries, and in washing compounds makes its preparation directly from common salt and P_2O_5 of interest. This reaction proceeds readily, but a part of the phosphorus passes out of the reaction chamber as chlorides of phosphorus. The latter reaction probably offers a method of preparing phosphorus chlorides. If the product desired is sodium metaphosphate, however, with no chlorides of phosphorus, the P_2O_5 may be formed by burning phosphorus with sufficient moist air to convert all the P_2O_5 to metaphosphoric acid. The hot metaphosphoric acid acting on the salt yields sodium metaphosphate and hydrochloric acid. The reaction between salt and P_2O_5, with and without moisture, is at present being studied in detail.—H. A. Curtis, R. L. Copson and A. J. Abrams, *Chem. & Met. Eng.*, Mar., 1937.



Recently completed plant of California Spray Chemical Corp. at Richmond, Calif.

Identification of Cellulose Types

Quicker, simpler volumetric method for the identification of alpha, beta, and gamma cellulose has been perfected by H. F. Launer of the Bureau of Standards. It employs a 0.3 gm. sample, which need not be weighed accurately, but a 0.03 gm. sample gives fair results. Neither ash nor moisture determinations are involved. No precision weighings are made. The cellulose is oxidized by potassium dichromate solution, the strength of which need not be known accurately, as the concentrations of the oxidimetric solutions do not enter into the calculations. The volumetric results are comparable with those of a gravimetric method, and are as reproducible, for widely different materials. Working time for four complete determinations is less than 2½ hours.

The alpha fraction is the cellulose which can be filtered from a mixture consisting of sodium hydroxide solution and the material being analyzed. Further differentiation is obtained by acidification of the filtrate, whereupon the beta fraction precipitates, and the gamma fraction remains in solution. High content of alpha cellulose usually indicates good quality. The interest in beta and gamma cellulose is as yet academic. The correlation between quality and the alpha-cellulose content is, however, not sufficiently close to indicate which existing method yields the most values. It seems, therefore, that the only criteria for the suitability of a given method are its simplicity and rapidity of execution, and its reproducibility, not only as regards agreement between duplicate determinations, but also as regards comparison between various papers among themselves or with the original pulp.

The materials studied by Launer were soda pulp, refined sulfite and sulfate pulps, known on the market as "alpha" pulp and bleached sulfate, respectively, also No. 1 old white rags, No. 1 new white rags, and No. 1 new white rag paper. The resins in theese materials did not in any case exceed 0.2 per cent. and were neglected.

Approximately 0.3 gms. of the material, reduced to fibrous condition in a "Dr. Koerner-type" grinder and well mixed, is weighed in a 100 cc. beaker to the nearest 10 mg., 20.0 cc. of 17.5 per cent. sodium hydroxide solution is added to the sample, which is then macerated until uniformly wet and dispersed, and allowed to stand for ten minutes. 33.0 cc. of water is then added, the mixture thoroughly stirred, and allowed to stand for one hour, stirring once during the interval. After stirring once more, about 5 cc. of the unsettled mixture is poured into a Gooch crucible and allowed to drain without suction. The filtrate and wash water run directly into a 100-cc. volumetric flask. With very gentle suction (pressure differential 10 to 20 mm. of Hg) the mat is formed through which the rest of the mixture is filtered. By avoiding excessive packing of the fibres owing to strong suction, very rapid filtering is usually secured. If the mat was successfully formed at the outset, the filtrate is poured back through it only once. The mat without being broken up is then washed with 35 cc. of water. The filtrate is diluted to the mark and treated as described later. The alkali-cellulose mixture, as well as the water and sodium hydroxide solution, are kept at 20 ± 0.1° C.

The alpha cellulose is moistened and removed from the crucible. The crucible is placed upright in a 400 cc. beaker and filled with 25 cc. of 12*N* (approximately 75 per cent. by weight) sulfuric acid, at room temperature, and then rinsed after a few minutes with 50 cc. more of the acid. The alpha-cellulose pad is then disintegrated in the acid, using a thermometer as stirring rod. After the alpha cellulose has dissolved, 25.00 cc. of potassium dichromate solution (about 1.835 normal) is added. The solution is heated to 140 to 150° C., at which temperature it is maintained for approximately ten minutes. Air is constantly bubbled in a fine stream through the solution to prevent troublesome bumping. The beaker should be covered with a watch-glass cut or notched to permit entrance of the thermometer and bubbling tube.

After the solution has cooled to 130 to 140° C., 50 cc. of water is added, the thermometer, etc., are rinsed down, and the solution cooled to 60° C. or lower. The remaining dichromate is then most simply titrated electrometrically with 0.5*N* ferrous ammonium sulfate solution. 50.00 cc. of the filtrate is pipetted into a 400-cc. beaker containing 5.00 cc. of the potassium dichromate solution. Cautiously, and with constant stirring, 50 cc. of concentrated sulfuric acid is slowly poured down the side of the beaker. The solution is then heated and later titrated.

The pipette used to deliver the beta-plus-gamma portion is rinsed out into the remaining filtrate, which is then acidified with 15 to 16 cc. of 6.0*N* sulfuric acid, using no indicator. After cooling, the cloudy mixture is diluted to 100 cc., poured into a Nessler tube or graduated cylinder and allowed to stand overnight. After the beta cellulose has settled, a 50.00 cc. portion of the supernatant liquid is cautiously removed and treated exactly as noted in the case of the alpha cellulose. The beta-plus-gamma mixture should be at room temperature while the gamma portion is removed.

The percentage of each fraction of cellulose is calculated by dividing the volume of dichromate corresponding to it by the total volume of dichromate for all three fractions. For example, if the alpha cellulose used 18.48 cc., and the beta-plus-gamma cellulose used 3.48 cc. of dichromate, then the total cellulose dichromate value is 21.96 cc., and the alpha-cellulose content is

$$\frac{18.48}{18.48 + 3.48} \times 100 = 83.8 \text{ per cent.}$$

The gamma-cellulose content is calculated in a like manner. The beta-cellulose content is found by difference.—*Jl. Research, U. S. Bur. Stands.*, Mar. 1937.

Iodine Value of Oils

Methods of Hübl, Wijs, Hanus, and Margosches, Hinnes and Friedmann for determining the iodine value of oils with linolic and erucic acids, triolein and trilinolin yield the following results.

Method	Oleic acid	Linolic acid	Erucic acid	Triolein	Trilinolin
	Differences between the average values obtained by the methods				
Hübl/Wijs	0.864	4.050	0.616	2.080	4.968
Hübl/Hanus	0.454	2.038	0.852	2.130	7.552
Hübl/Margosches	0.746	20.318	2.630	2.534	13.340
Wijs/Hanus	1.590	2.012	0.236	0.050	2.584
Wijs/Margosches	0.390	25.168	3.246	4.614	18.308
Hanus/Margosches	1.200	22.856	3.482	4.664	20.892

From these results the probable error is calculated by Netto and the following conclusions drawn:—(1) the methods studied show, for oils of known iodine value, significant deviations from the theoretical values; (2) for some of the oils the results of the various methods differ from one another; (3) the following methods do not show significant differences from one another, when the probable errors are 0.05 and 001; for oleic acid, none of the methods; for linolic acid, the methods of Hübl and Hanus, and of Wijs and Hanus; for erucic acid, the methods of Wijs and Hanus; for triolein, the methods of Wijs and Hanus; for trilinolin, none of the methods.—*Estudos Quimicos, Bol. 21* (*Portugal*), pI-71.

New Low-cost Plastic

An inexpensive plastic material is being made in Russia from sawdust or straw. It is described as "fused wood pulp" and is a brown or black material having a fine grained structure. The hardness is from 32.6 to 43.0 Brinell. One variety is highly resistant to nitric acid, but does not withstand hydrochloric acid so well.—*British Plastics*.

New Equipment

Electrically-Operated Flow Meter

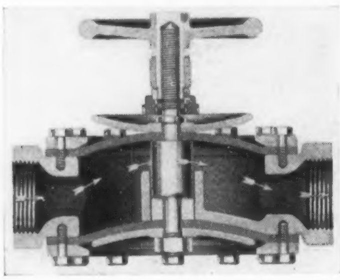
A new electrically-operated flow meter known as the Synchro-Meter has been developed by Bailey Meter Co., Cleveland, Ohio, for which the company claims many distinct advantages.

Continuous CO_2 Recording

Using a much-simplified cell assembly which conditions a flue-gas sample by *saturating* rather than drying it, an improved equipment announced by Leeds & Northrup, 4934 Stenton ave., Philadelphia, Pa., offers steam plants high accuracy and quick response in continuous CO_2 recording, with low maintenance.

Balanced Diaphragm Valve

McAlear Mfg. Co., of Chicago, has developed and manufactured a new, Balanced Diaphragm Valve which has the feature of closing off tight, repeatedly, in service on fluids or gases containing foreign matter. Being balanced, it will open or close easily. There are no bellows or stuffing boxes, thus preventing all friction. When used on throttling service, there are no bad effects from wire drawing. This valve need not be removed from the line to change the diaphragm which can be supplied of various compositions to take care of air, water, gas, acids, or alkalis. Made of either ferrous or non-ferrous materials, it can be suitably lined for all acids and alkalis, hot and cold. It will operate in any position, will not damage from freezing, and can be either hand or motor operated. Made in sizes of two inches and larger. Patents are pending.



Improved Steel Elevator Buckets

A notable improvement in the design and construction of Salem steel elevator buckets is announced by Link-Belt Company, Chicago; probably the first radical change in 60 years. The new so-called Super Salem Steel elevator bucket is reinforced at the digging lip, front corners and along back. Additional strength and greater resistance to abrasive wear and distortion are claimed for this construction, without increase in bucket weight.

Copper Oxide Plate Type Rectifiers

Copper oxide plate type rectifiers provide a new, practical means of converting alternating current into direct current for use in the electroplating industry. This equipment is manufactured exclusively by Hanson-Van Winkle-Munning, Matawan, N. J., in connection with Westinghouse Electric.

Low-Pressure Refrigerating Units

A new line of self-contained low-pressure refrigerating units has been announced by Carbondale Division of Worthington Pump and Machinery, Harrison, N. J. These units are designed to employ either freon or methyl chloride as a refrigerant and are recommended for both air conditioning service and general refrigerating purposes.

Portable Power Mixers Redesigned

Patterson Foundry and Machine Co., East Liverpool, Ohio, has redesigned their entire line of Typhoon Portable Power Mixers, making many improvements and still further increasing their portability. Reduction in weight has been attained by the use of aluminum in construction. The frame of the motor, end bells and lower housing are all made of polished aluminum. Weight savings result in as much as ten lbs. in the ¼ H. P. size alone. Polished aluminum and chromium plate finish is employed throughout. No paint is used on these new models. The geared Typhoons now have an aluminum frame motor built in a chromium plated case containing a highly developed bronze ball-bearing gear reducer which is chatter free and silent under all loads. The complete line of Typhoons is fitted with fan-cooled, down-draft, self-ventilating motors as standard equipment, and with starting switches built inside of motor frames. The efficient propellers insure complete mixing in the vertical plane and the adjustable shaft is equipped with a heavy duty guide bearing to eliminate whip.

Locking Lever Closure for Steel Pails

Wilson & Bennett Mfg. Co., Chicago, announce a new E-Z Seal Outside Locking Lever Closure for their line of steel pails. The most important feature of this new E-Z Seal Closure is that it fits the standard pails produced by this company. It is not necessary for the shipper to adopt a different type of pail, or to carry a double stock. The covers and closure of these new E-Z Seal Pails are interchangeable with the regular lug covers. Container stocks can thus be kept at a minimum.

New Line of Chlorinators

Everson Manufacturing, 214 West Huron st., Chicago, pioneer manufacturers in water treatment for drinking water and swimming pools have definitely tossed their hand into the "water works and sewage" ranks with the announcement of a new line of Everson Rota-Meter chlorinators with capacities of one-half of one lb. to one thousand lbs. of chlorine gas per 24 hours.

Koppers New Construction Contracts

Contracts for remodeling and modernizing two liquid purification plants have just been awarded to Koppers Company's Engineering and Construction Division. The purification plant of the Hudson Valley Fuel Corporation at its coke oven gas plant in Troy, N. Y., will be changed over to the Koppers-Thylox process from the Koppers-Seaboard process. Capacity will be increased from 18,000,000 to 24,000,000 cubic feet a day. The Rochester Gas and Electric Corporation's Koppers-Thylox plant at its coke oven and water gas generating station in Rochester, N. Y., will be modernized. This equipment has a capacity of 20,000,000 cubic feet a day. Engineering work on both contracts has been started and construction will begin in about six weeks.

Elsenbast Vice Pres. J.-M. Sales Corp.

Arthur S. Elsenbast, manager filter aids and filler department, Johns-Manville, has been appointed vice president of the Johns-Manville Sales Corporation. As vice president, he will continue in charge of this department which he has headed for the last four years.

Powe to South Africa for Oliver

William A. Powe, sugar filtration specialist, who represents Oliver United Filters Inc. in Cuba and other West Indies Islands, leaves about May 1 for South Africa where he will supervise the first installation of Oliver-Campbell Cane Mud (Cachaza) Filters in that country in the mill of the Tongaat Sugar Co., Natal. He will cooperate with Edward L. Bateman, Pty., Ltd., representatives of Oliver United Filters Inc. in South Africa.

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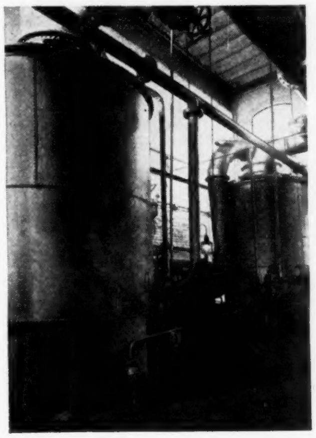
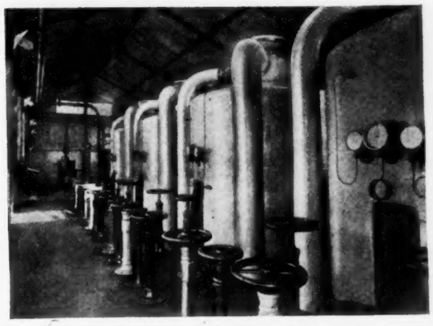
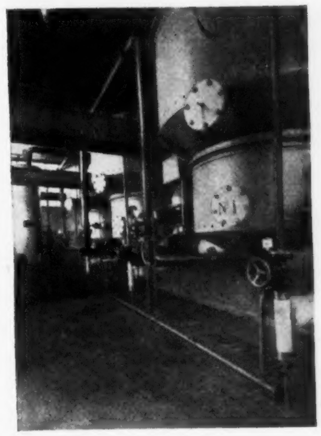


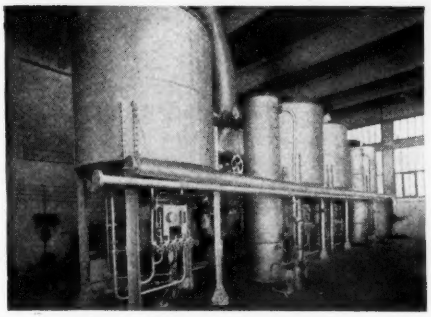
One of two installations made for a prominent rubber manufacturer. Recovers 71,500 pounds of naphtha daily.



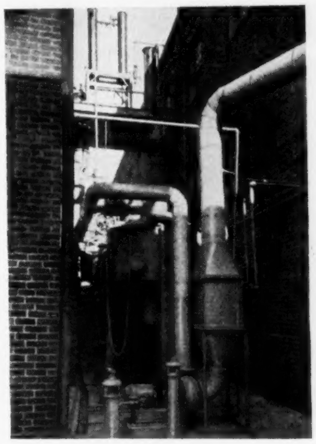
One of three installations made for a large petroleum company. Extracts 121,000 pounds of gasolene daily.



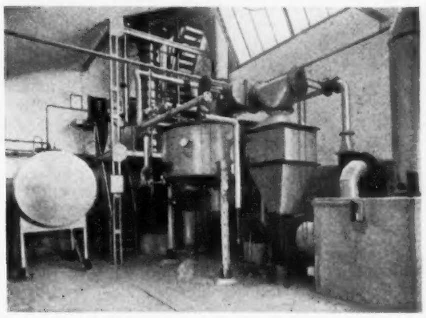
Recovery of xylol and naphtha in a large gravure printing plant. This field was developed by Acticarbone.



Modern four-adsorber installation recovering naphtha in a dry-cleaning plant. The solvent loss is less than 3% of the weight of garments cleaned.



Recovery and rectification installation in a fabrics coating plant. Capacity 2,000 pounds daily of acetone, ethyl acetate and naphtha.



Single-adsorber installation for limited use in a celluloid manufacturing plant with alcohol rectification equipment.

• For more than fifteen years the Acticarbone Process has been serving industry through efficient, low-cost recovery of industrial solvents • More than four hundred installations have been made and are in operation in every continent • Acticarbone has successfully pioneered efficient and economical recovery in industries such as Dry Cleaning and Gravure Printing where its application had previously not been considered feasible • By bringing together unusual engineering skill and a thorough knowledge of industrial practices, Acticarbone developed the first effective fool-proof application of full automatic control* for the operation of solvent recovery plants on a predetermined cycle • This extensive background is at your command without obligation.

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ACTICARBONE

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Booklets & Catalogs

Companies whose booklets are reviewed on this page will be glad to supply readers of "Chemical Industries" with copies free, provided this magazine is mentioned and the request is made on company stationery. Your business title should also be given.

Chemical

American Oil & Supply Co., 238 Wilson av., Newark, N. J. Catalog No. 6 lists products distributed, also their own chemical specialties.

Association of Consulting Chemists and Chemical Engineers, Inc., 50 E. 41st st., N. Y. City. Directory of Members, Third Edition, listing activities of members and various types of work handled by each.

Cloroben Corp., Jersey City, N. J. **The Cloroben News**, Spring 1937, Vol. 1, graphic news sheet, minus illustrations, devoted to uses of Cloroben and Soluble Cloroben, new sanitation chemicals.

E. I. du Pont de Nemours & Co., Inc., R. & H. Chemicals Dept. Quarterly Price List for all industries.

E. I. du Pont de Nemours & Co., Wilmington, Del. News Bulletin entitled "How an American Technical Laboratory Solves the Problem of Fast Dyes." An excellent, informative compilation on this subject written for the benefit of dye users, discussing in detail technical problems encountered in laboratories.

E. I. du Pont de Nemours & Co., Wilmington, Del. Electroplating Service Bulletin, February 1937, deals with the subject of Solution Control for Electroplating.

H. M. F. Faure & Co., Cunard House, Leadenhall st., London, E. C. 3, England. "Review of the Oil and Fats Markets, 1936," a comprehensive, statistical report issued yearly, of interest to all producers, consumers and dealers in this field.

International Tin Research & Development Council, 149 Broadway, N. Y. City. Booklet A48 features "Production of Black Anodic Coatings on Tin."

Mallinckrodt Chemical Works, St. Louis, Mo. April Price List.

Monsanto Chemical Co., St. Louis, Mo. Booklet describes uses of Ferrisul, product for treating water, sewage, and industrial wastes.

Penn Salt Mfg. Co., 1000 Widener Bldg., Phila., Pa. Booklet No. Three on Pentchlor Acid-Proof Cement contains useful information and practice in construction of acid-proof masonry in various installations, proper treatment of masonry linings, and technical data.

Prior Chemical Co., 420 Lexington ave., N. Y. City. "Priorities," April 1937, tells about various uses of carbon tetrachloride. The May issue will carry an interesting story on the origin of tin and its many uses in the industry.

Schimmel & Co., 601 W. 26th st., N. Y. City. "Schimmel Briefs," April 1937, contains interesting reference to rosin soaps.

Textile Economics Bureau, Inc., 21 East 40th st., N. Y. City. **Rayon Organon**, April 1937, compilation of market data for the rayon and allied industries.

Textile Foundation, Inc., Washington, D. C. **Textile Waste Treatment and Recovery**, a survey of present knowledge concerning the treatment and disposal of waste waters in the textile industries.

U. S. Dept. Commerce, Bureau Foreign & Domestic Commerce, Washington, D. C. Survey of Current Business, Vol. 17, No. 4, 56 page booklet summarizing the statistics of the business situation.

Waverly Oil Works Co., Pittsburgh, Pa. Ninth Edition, **Waverly Handbook**, now on sale. Has over 900 pages of technical, engineering and chemical data pertaining to the petroleum industry.

Wishnick-Tumpeer, Inc., 295 Madison ave., N. Y. City. **Witcombings**, April, 1937, shows several views of new Continental Carbon plant near completion.

Equipment, Apparatus

Mixers—Leaflet lists various types, also gives salient features of new noiseless "Hy-Speed" Labelit machine for faster and smoother labeling. Alsop Engineering Corp., Milldale, Conn.

Pyrometers—New catalog No. 15-C covers the complete line of Millivoltmeter Type Pyrometers for indicating, recording and controlling. Brown Instrument Co., Division Minneapolis-Honeywell Regulator Co., Phila., Pa.

Control Instruments—Leaflet covers full line of instruments for temperature control. Burling Instrument Co., 241 Springfield ave., Newark, N J.

Bagology, April, 1937, contains interesting statistics on the cotton industry. Chase Bag Co., 155 E. 44th st., N. Y. City.

The Moly Matrix, March, 1937, describes manufacture and function of oil field tongs. Climax Molybdenum Co., 500 5th ave, N. Y. City.

Ro-Ball Stabilized Gyrating Screens—Folder No. 365, lists specifications of this apparatus which is said to provide clean, accurate separations of the most difficult materials on a production basis. Bulletin 447 also lists specifications and descriptions of Day Paint Mixers. J. H. Day Co., Cincinnati, O.

Solution Feed Chlorinator—Outline of company's Rota-Meter chlorinators, showing interesting chart of gas absorbing apparatus for treatment of swimming pool water, city water supplies, and sewage. Everson Mfg. Co., Chicago, Ill.

Lubricants—Leaflet on Lubriplate Film, for speeding up production machines and lowering operating costs. Fiske Bros. Refining Co., 24 State st., N. Y. City.

Recording Instruments—Booklet GEA-1061F describes in detail company's line. General Electric Co., Schenectady, N. Y.

Electric Heating Units and Devices—Booklet GED-650 lists numerous small heating units of all kinds and for a multitude of tasks. General Electric Co., Schenectady, N. Y.

Air Ejectors—Bulletins 101-2 illustrate and describe improved types of single and two stage types. First is of the non-condensing type; the second is equipped with inter condenser for high vacuum. Graham Mfg. Co., 220 Delaware ave., Buffalo, N. Y.

Water Coolers—Catalog and Price List No. 6 deals with industrial coolers. Several charts with dimensions are included. Graham Mfg. Co., 220 Delaware ave., Buffalo, N. Y.

Corrosion in cooling systems and suggested methods for its control are given in **H-O-H Lighthouse**, Vol. 4, No. 2. Company will also supply reprints on "Corrosion Control in Brine Systems," "Scale and Corrosion Control in Internal Combustion Engines," "Chrom Glucosate," and "Organic Methods of Scale and Corrosion Control." D. W. Haering & Co., Inc., 3408 Monroe st., Chicago, Ill.

J-Metal Cutting Tools, handsomely illustrated and informative bit of literature, describing engineering service, laying stress on the properties and economies of J-Metal and presenting data on the recommended procedures for its use. Haynes Stellite Co., Kokomo, Ind.

Motorblowers—Bulletin 2161-A, devoted to Single-Stage, Type FS Motorblowers, illustrated discussion of the theory of centrifugal air compression to pressures up to 3 lbs., and also contains illustrations covering the seven major fields of Motorblower application. Ingersoll-Rand Co., Phillipsburg, N. J.

Nickel Steel Topics, April, 1937, extremely interesting issue, notably double page spread on excavating and material-handling equipment. International Nickel Co., 67 Wall st., N. Y. City.

Laboratory Equipment—Folder for filing describes company's line of laboratory equipment; mixers, colloid mills, clarity testers, storage sets, Polarizer-analyzer for microscopes, etc. Laboratory Equipment Co., 146 Lafayette st., N. Y. City.

Lift Truck Platforms—Folder No. 322 states most economical method of interior transportation of goods, material, and products. Lewis-Shepard Co., Watertown, Mass.

Link-Belt News, April, 1937, contains many items on conveying and power transmitting industry, also report issued by the president to the company stockholders. Link-Belt Co., Chicago, Ill.

Gas Analysis—Catalog N-91-163, describes Micromax CO_2 recording equipment for flue-gas analysis. Illustrations, charts and dimensions add to the value of the information. Leeds & Northrop Co., 4902 Stenton av., Phila., Pa.

Dermatitis—Leaflet devoted to battle against industrial dermatitis describes effectiveness of Ply Protective Creams. Manufactured by Milburn Co., Detroit, and distributed by Pulmosan Safety Equipment Co., 176 Johnson st., Brooklyn, N. Y.

Poison Gas Alarm—An attractive brochure announces the MSA Combustible Alarm, instrument for continuously sampling atmospheres where combustible gases and vapors may be present, and which provides an electrical warning when the concentration of flammable gases exceeds a predetermined limit. Mine Safety Appliances Co., Meade, Thomas and Braddock aves., Pittsburgh, Pa.

Safe Practices—Pamphlet No. 22 outlines safety precautions to be observed in industrial shop lighting, while Pamphlet No. 52 refers to the hazards of static electricity. National Safety Council, Inc., 20 No. Wacker drive, Chicago, Ill.

Dust Control—Folder on company's line of dust control and blast cleaning equipment, also lists booklets "Industrial Dust Control Through Exhaust Systems" and "CH" Dust Collector Bulletin which may be obtained by writing to Pangborn Corp., Hagerstown, Md.

Phoenix Flame, April, 1937, an interesting house organ brimful of everyday interest. Phoenix Metal Cap Co., 2444 W. 16th st., Chicago, Ill.

Foot Accidents—Leaflet describes Sankey Steel Foot Guard and Sankey Rigidlum Foot Guard. Pulmosan Safety Equipment Co., 176 Johnson st., Brooklyn, N. Y.

First Aid—Leaflet lists company's line of first aid products; bandages, compresses, adhesive plasters, etc. Pulmosan Safety Equipment Co., 176 Johnson st., Brooklyn, N. Y.

Protective Metal Paint—Folder "Quigley Triple-A No. 20 Heavy-Duty Black," a heavy-duty protective coating for steel against corrosion. Gives clear illustration of exposure tests. Quigley Co., Inc., 56 W. 45th st., N. Y. City.

Insulation—Folder gives outstanding characteristics of Insulblox, light weight low heat storage refractory block insulation, and other Insuline products and refractories. Quigley Co., Inc., 56 W. 45th st., N. Y. City.

The Enduro Era, March, 1937, profusely illustrated, features economy of Enduro in meat packing industry. Republic Steel Corp., Cleveland, O.

Robertson Reminders, April, 1937, published every now and then, calls attention to the Robertson Hydro-Pneumatic Accumulator and the Robertson Pump. John Robertson Co., Inc., 121 Water st., Brooklyn, N. Y.

Filling Machines—Bulletin 701 presents new ideas in tube filling, closing and sealing, and describes the advantages of the Stokes patented method of "fat-filling" collapsible tubes to save tube metal or increase the sales appeal of the package, and the Westite Process of sealing tubes which makes the closure air-tight and leak-proof. F. J. Stokes Machine Co., Olney P. O., Phila., Pa.

Water Stills—Bulletin No. 625 mentions their line of laboratory and small industrial type water stills with specifications, illustrations, and prices. F. J. Stokes Machine Co., Olney P. O., Phila., Pa.

Heater Recording—Catalog No. 1101C on pyrometers, contains a number of new developments, particularly a new High Speed Photoelectrically Balanced Multipoint Recorder. C. J. Tagliabue Mfg. Co., Park and Nostrand aves., Brooklyn, N. Y.

Synthetic Rubber—The various fields in which Thiokol materials find use, write for **Thiokol Facts**, Vol. 1, No. 6. Thiokol Corp., Yardville, N. J.

Gas Generator—Bulletin No. 95, devoted to description of the general principles of the Wellman Galusha Clean Gas Generator, amply illustrated, gives typical analysis of Wellman-Galusha gas, also table on cost of using generator. Wellman Engineering Co., Cleveland, O.

Electrical Instruments—Catalog Section 43-350 announces new line of Westinghouse Miniature instruments for all types of industrial and radio applications. Included are applications, construction, operation, outline dimensions, wiring diagrams, ratings, and price lists. Westinghouse Technical Press Service, Dept. 5-N, East Pittsburgh, Pa.

Compressors—Bulletin L-612-B3, improved, opposed steam-driven compressors, embodying the simple light-weight feather-type valves for which important advantages are claimed. Specifications, illustrations, and charts are profuse. Worthington Pump & Machinery Corp., Harrison, N. J.

Roller Mills—Two booklets describe and list specifications of Kent All Five Roller Mill and the Junior "All American 5" Roller Mill. Kent Machine Works, 39 Gold st., Brooklyn, N. Y.

The Laboratory, Vol. 8, No. 5, aside from mentioning new additions to company's line of laboratory apparatus, contains interesting article on sulfur.

Packomatic, April 1937, devoted to packaging installations of company, and other packaging news. J. L. Ferguson Co., Joliet, Ill.

New Products and Processes

A Digest of Chemical Uses and U. S. Patents

Demonstration of dyestuffs at the du Pont exhibition at Rockefeller Center.

Solvents and Diluents in Nitrocellulose Lacquers

By Ray M. Carter

U. S. Industrial Alcohol Co.

IN ordinary paint the linseed oil portion of the vehicle constitutes the film-forming body. Without it there would be no continuous protective coating. Quite to the contrary, the solvents and diluents of a nitrocellulose lacquer do not appear in the final film. They merely serve to dissolve the film-forming materials—the nitrocellulose, resins and plasticizer—conferring upon the lacquer the property of workability.

In the early years of nitrocellulose lacquer there were few available solvents. Amyl acetate and fusel oil were commonly used, and for certain special cases mixtures of ether and alcohol or camphor and turpentine were available. As soon as low-viscosity nitrocellulose was commercially available, attention was focussed sharply upon the field of solvents. The phenomenally rapid growth of the lacquer industry stimulated active research for new solvents. For example, there resulted the production of n-amyl acetate from pentane, cellosolve acetate from ethylene, secondary butyl and amyl acetates from isobutylene and isoamylene, and of ethyl lactate from acetaldehyde and hydrocyanic acid.

The commonly used lacquer solvents may be grouped in three general classes: (1) Esters; (2) Ketones; (3) Alcohols. There are also numerous solvents in general use which are of a "two type" class; that is, they combine in one substance the properties of two different classes. For example, ethyl lactate contains both an ester and an alcohol group while cellosolve acetate combines in one molecule an ester and an ether grouping. The esters and the ketones are active nitrocellulose solvents while the alcohols are latent solvents; that is, they are not solvents by themselves but become good solvents when mixed with certain other materials.

The ideal solvent should meet the following criteria:

(1) It should be a solvent for both the nitrocellulose and the resin.

(2) It should be non-hygroscopic.

(3) It should produce solutions of low viscosity with fairly high concentrations of nitrocellulose.

(4) It should have no objectionable odor.

(5) It should be stable and have no untoward action on nitrocellulose or pigment.

(6) It should stand dilution with a hydrocarbon diluent.

(7) It should be cheap.

(8) It should be readily available.

(9) It should evaporate rapidly at the beginning and slowly at the end of the evaporation.

It is readily apparent that no single solvent will have all these desirable properties, hence the use of mixed solvents is necessary. One of the jobs of the lacquer technologist is to so choose the constituents of a lacquer solvent as to combine maximum workability with minimum cost.

Lacquer solvents have long been classified by their boiling points, as follows:

Low boiling solvents (below 100° C.)
Medium boiling solvents (about 125° C.)
High boiling solvents (above 150° C.)

Such a classification is far from ideal, but it has the authority of age and does serve as a guide in marshalling data on the properties of individual solvents and for the comparison of different solvents. A much more useful classification would be by evaporation rates instead of by boiling points.

The low boiling solvents, typified by ethyl acetate, include such materials as isopropyl acetate, ethyl alcohol, ethyl propionate, isopropyl alcohol, and dioxan. Because such solvents have a high evaporation rate, they cause the lacquer to dry quickly. The low boiling solvents also lower the viscosity of the nitrocellulose solution thereby making it usable in a spray gun. These solvents are usually the least expensive of the useful solvents, and their maximum use will lead to economy.

The low boiling solvents with all their excellent qualities will not alone produce a satisfactory film. Their rapid rate of evaporation does not allow the film to form a smooth, continuous and homogeneous coating. For this purpose the medium boiling solvents are used. This class, of which butyl acetate is a well known member, also includes amyl acetate (both synthetic and from fusel oil), fusel oil, butyl alcohol, cellosolve acetate, secondary butyl and amyl alcohols and the corresponding acetates. It is upon this type of solvent that we depend for the smooth flow-out of the emerging film. The formation of the film by evaporation of the solvents is a highly complex process. The non-volatile ingredients; viz., the nitrocellulose, resin and plasticizer, should form a smooth, tough, adherent, homogeneous residue of a colloidal nature. While we know very little about the forces that are set up within the film as the solvent evaporates, we can exercise some control over the properties of the final film by the proper choice of the solvent mixture.

The high boiling solvents are those residual solvents which are the last to leave the film, and they are responsible for the final smoothing of the hardening film and for the continuous blending of the non-volatile portion of the lacquer as the evaporation draws to a close. Such solvents are exemplified by ethyl lactate, butyl cellosolve, butyl cellosolve acetate, diacetone alcohol and beta-hydroxybutyric ester.

The high boiling solvents can be and often are replaced by an equivalent amount of medium boilers, but it would seem reasonable to expect that the use of high boilers would tend to relieve some of the strains set up within the film during the final stages of evaporation. An undue amount of such strain is very likely the cause of many early failures of lacquer films.

Plasticizers form a very important group of lacquer solvents. They are the non-volatile solvents for both resin and nitrocellulose and their role is to impart flexibility, increase adhesion and blend together all the constituents of the final film. They should have very slight solubility for water, thus eliminating moisture absorption with subsequent deterioration of the film. The most commonly used plasticizers are esters, such as ethyl, butyl or amyl phthalates, triphenyl and tricresyl phosphates, and certain high boiling esters of the glycol ethers. Camphor is much used for certain special applications of lacquers, as is also castor oil, which, while it has no solvent action on nitrocellulose acts as a softening agent for the film.

Plasticizers do not make films truly elastic but they do increase the elongation of films under stress, at the same time decreasing their tensile strength. Without plasticizers nitrocellulose films would have little practical value. A very great many chemical compounds have been advocated for this use and many have highly specialized but limited fields of use.

Diluents are used in order to decrease the cost of the lacquer and also to decrease the excess solvent power of the solution to the point where the freshly applied coating will not excessively soften and "lift" the under-coats.

Until recently the only lacquer diluents in use were the aromatic hydrocarbons, benzol, toluol and xylol. Benzol fell into disfavor because of its marked poisonous properties. Because of the mounting price and scarcity of the other two an intensive search for substitutes began. As a result there are available today a variety of petroleum hydrocarbon fractions ranging in

boiling point from benzol to xylol. These are readily available, cheaper than the aromatics, and their early drawback, bad odor, is now practically eliminated. They labor, however, under two disadvantages; first, they have greater precipitating power for nitrocellulose than do the aromatics, and second, they produce solutions of higher viscosity than the aromatics. Their use may require the presence of somewhat more active solvent than otherwise would be necessary, but their cheapness may more than offset the cost of the extra solvent. Their use has increased rapidly during the past few years, and a number of the petroleum companies market special cuts for this use. To a smaller extent use is also made of the newer hydrogenated petroleum fractions.

In connection with the use of hydrocarbon diluents it is interesting to note that the presence of aliphatic alcohols, non-solvents in themselves, increases very markedly the amount of hydrocarbon which may be added to a nitrocellulose solution and still get clear films on evaporation. A mixture of any alcohol and any hydrocarbon is a better diluent than either ingredient alone.

Reid and Hoffman* have shown that a mixture of 70 per cent. xylol and 30 per cent. butyl alcohol evaporates with constant composition and at a considerably increased rate over either ingredient alone. The xylol, being removed at a faster rate, does not concentrate to the point where blushing or precipitation of the nitrocellulose would occur.

How does one judge the merits of several competing solvents for a particular use? In most instances a determination of the dilution ratio, evaporation rate and blush resistance will be sufficient to properly gauge the value of any solvent.

A solution of nitrocellulose will tolerate the addition of a certain amount of non-solvent, after which further addition causes precipitation of the nitrocellulose. This limit of tolerance is called "dilution ratio," and is numerically equal to the volume of diluent used divided by the volume of sample taken.

It is usual to quote dilution ratios in terms of two hydrocarbon diluents: toluol and some petroleum hydrocarbon. The ratios are always smaller for petroleum hydrocarbons than for toluol, as mentioned earlier. The dilution ratio is the most convenient method available for expressing the relative solvent properties of liquids for nitrocellulose. The precipitating effect of diluents is also determined by the same procedure, using a lacquer made with a standard solvent mixture.

Table 1 lists the dilution ratios of some of the more common solvents. It will be noticed that an increase in molecular weight of the alcohol, as from ethyl to amyl acetate, or ethyl to amyl phthalate, results in decreasing toluol tolerance and increasing petroleum hydrocarbon tolerance. There are two solvents whose petroleum and toluol tolerances are almost identical. These are diamyl phthalate and diethyl carbonate, one a strong, the other a weak solvent.

Table 1

Dilution Ratios of Common Solvents

Solvent	Dilution Ratio: Toluol	Dilution Ratio: Petroleum Hydrocarbon
Acetone	4.3	0.7
Amyl acetate, commercial	2.7	1.5
Butyl cellosolve	3.4	2.0
Butyl acetate	2.9	1.4
Cellosolve	5.3	1.1
Cellosolve acetate	2.4	0.8
Diacetone alcohol	3.3	0.5
Diethyl phthalate	3.8	0.7
Dibutyl phthalate	2.6	1.7
Diamyl phthalate	2.2	2.0
Diethyl carbonate	0.6	0.4
Ethyl acetate, 85-88 per cent.	3.5	1.1
Ethyl lactate	5.5	0.8
Ethyl oxy-butyrate	4.9	1.4
Secondary butyl acetate	2.8	1.4
Secondary amyl acetate	1.9	1.1
Pentacetate	2.2	1.3
Isopropyl acetate	2.8	1.0

* Reid and Hoffman, Ind. and Eng. Chem., Vol. 20, p. 687.

As stated before the evaporation rate of a solvent is most important. The speed of evaporation affects many of the properties of the film formed when the volatile constituents evaporate from the non-volatile portion of the lacquer. The vaporization of solvents from a lacquer and the proportioning of these solvents so that the mixture remains balanced during drying is a complex problem. Lacquer solvents do not evaporate at their boiling points when the lacquer is applied and dried in the usual manner. It has been shown that neither the boiling points nor vapor pressures can be taken as an index of how the solvents will evaporate from the film. Certain binary mixtures of solvents or solvents and diluents are known to have higher vapor pressures than either of the components. These mixtures give off a vapor of constant composition and evaporate in a manner quite unlike that which would be expected from their boiling points. For this reason it is better to determine the evaporation rate of a solvent mixture containing the material in question, rather than the evaporation rate of the solvent alone.

There is at present no standard method for determination of evaporation rate. All methods are empirical and one should not compare published rates unless he is sure that they were determined under comparable conditions.

One requisite of a good lacquer solvent is resistance to humidity, better known as blush resistance. Blushing under moist conditions is generally not due so much to evaporation rate as to the solubility of water in the solvent. For example, a hydrocarbon solution of a resin will not blush at a given humidity whereas an alcoholic solution of the same resin, although evaporating more slowly, will blush badly.

Determinations of blush resistance are of especial help in the formulation of lacquer thinners. These thinners are mixtures of solvents and non-solvents, having considerably reduced solvent power. They are especially useful to the small manufacturer who does not wish to take the time to properly formulate and blend his own thinners.—Abstracted from *Metal Cleaning & Finishing*, Mar., '37, p201.

Synthetic Tanstuffs from Coal Tar

In the majority of synthetic tannins from coal tar are tanning properties conferred through the process of condensation. The basis of manufacture was really Williamson's reaction; for example, the treatment of benzene with formaldehyde in the presence of a trace of acid or alkali when diphenylmethane was formed. This could be looked upon as the parent substance which had to be rendered soluble in water. This was accomplished by sulfonation at low temperatures to give the sulfonic acid. Diphenylmethane disulfonic acid when partly neutralized would precipitate gelatin, but has no true tanning action. This compound could be further condensed to give a four chain structure with three CH_2 bridges. This type of non-tanning synthetic tannin has useful application in filling a leather. The presence of an OH group directly attached to the ring (phenolic OH) changes these actual tanning compounds. This was typified by Stiasny's Neradol D prepared by the sulfonation and condensation of phenol.

Although the CH_2 bridges between the aromatic nuclei were essential and also the phenolic OH group, the masking of this latter, for example by esterification or alkylation, would still yield a tanning agent and probably one with increased fastness to light. With such masked products, however, there was an increased sensitiveness to electrolytes. Long chains of carbon rings enhance tanning power and the longer the chain, the less acid was required to bring about complete solubility, a point of

practical importance. In spite of advances, however, the cresols and naphthalene were still the main raw materials used in the making of synthetic tannins. The preparation of fast-to-light synthetic tannins required in the production of white leathers centers round the sulfones, although absolute fastness to light starting with aromatic hydrocarbons has not yet been accomplished.

Combination of the urea-formaldehyde resins with synthetic tannins give light resisting products, but some difficulties had been met with, but if diphenylsulfone is coupled with urea-formaldehyde resin, a superior type of synthetic tannin is obtained, types of which are now on the market. Although the reactions proceeding in synthetic tannin making were simple on paper there is little doubt that more highly polymerized products are formed than could be expressed by a simple reaction. Water soluble urea-formaldehyde resins for the production of leather can be made practically neutral and the tanner can adjust his liquor to any desired pH.

The modern synthetic tannin is usually designed for a specific purpose, and one made for re-tanning could hardly be expected to function as an effective bleach. Similarly, if a white, light-resisting tannage was required, then the synthetic tannin designed for that purpose should be used.—Abs. from lecture at Leathersellers Technical College, London, by F. A. G. Enna (Monsanto Chems. Ltd.).

High Impact Phenolic Plastic

Durez 1590, a phenolic molding material with five times greater impact strength than standard molding materials has been developed by General Plastics, Inc., No. Tonawanda, N. Y. Material has an impact strength of .7 (A.S.T.M.) and is for industrial applications where greater resistance to shock is desired, along with other well-known properties of molded plastics. It molds and preforms easily, has a relatively low bulk factor and in molded form has a somewhat rippled surface, which can be minimized by ribbing or engraving in the mold on decorative pieces.

Protective Coatings

A complete line of protective coatings for industry, including the nationally-known Bitumastic Black Solution, is announced by Wailes, Dove-Hermiston Corp., Newcastle-on-Tyne, England. These products are being marketed by the Industrial Division. An interesting feature of this line is that it represents a compact group of products, which while sufficient in variety and color range to take care of all practical industrial maintenance requirements, at the same time simplifies selection, ordering and storage by the user.

New Use for Graphite

Shattering and cracking of pea seed in the internal force feed type of grain drill generally employed in sowing peas in New York State can be overcome by adding as little as 1½ ounces of graphite to each bushel of seed, according to Dr. J. G. Horsfall, plant disease specialist at the Experiment Station at Geneva.

Month's New Dyes

Geigy Company has issued a pamphlet containing twenty-four dyeings and discharge effects obtainable with their series of Setacyl Direct Dyes which includes: Setacyl Direct Yellow 5G Supra; Setacyl Direct Yellow 3G Supra; Setacyl Direct Yellow RN Supra; Setacyl Direct Scarlet 2GN Supra; Setacyl Direct Red B Supra; Setacyl Direct Violet 2R Supra; Setacyl Direct Discharge Blue 2R Supra; and Setacyl Direct Discharge Blue G Supra, from which a full line of yellows, oranges, reds, violets and blues can be produced by the use of these dischargeable direct dyes.

General Dyestuff offers Diazo Brilliant Scarlet 3G, a new Diazo color, which, when developed with Beta Naphtol, produces a bright scarlet,—with Developer ZA, a reddish orange of very good fastness to washing and fairly good fastness to light. Cotton-rayon mixed goods are dyed a uniform shade.

Ceramic Material for Laboratory Table Tops

"Kemite" has been developed as a material for laboratory table tops. Stuart M. Phelps and Edward E. Marbaker, of Mellon Institute, Pittsburgh, suggest that its characteristics make it available for use in other kinds of laboratory and plant equipment. It is described as an easily moldable ceramic body into which have been incorporated carbonaceous substances to increase the porosity after firing.

Synthetic Plant Hormone

"Hortomone A", a synthetic product which acts like a plant "hormone" in stimulating the formation of root growth, is being marketed by a British firm, according to a report from Asst. American Trade Commissioner W. S. Lockwood, London, made public by the Commerce Department's Chemical Division.

Solvenized Gasoline

Solvenized gasoline is a compound of halogenated hydrocarbons and high-grade lubricating oils, a combination that reduces friction by forming an absorbed film, one of almost molecular thickness, which makes engines run many degrees cooler. Valves, piston rings and other inner engine parts also function better because of the gum-dissolving properties inherent in the solvenized fluid. The Jenney Mfg. Co., Boston, Mass., has obtained exclusive rights to the process for Jenney Solvenized Gasoline for the entire New England territory.

Anodic-Oxidation Process

The remarkable success attained with the anodic oxidation of aluminum and its alloys has prompted attempts to develop a similar treatment for magnesium. A process has been perfected at the U. S. National Bureau of Standards which combines in large measure the advantages of the chrome-pickle and the alkaline chromate treatments. New process is described by R. W. Buzzard and J. H. Wilson in the January issue of the *Journal of Research* of the Bureau.

Spodumene

Spodumene, a little-known mineral, is to be put to work through a process developed by the U. S. Bureau of Mines, in the air-conditioning of buildings, the making of better pottery, and the production of lithia water, storage batteries, and special types of extremely tough glass.—*Canadian Chemistry and Metallurgy*, p85.

New Synthetic Tanstuff

By combining in an acid medium a crystalline, water-soluble, glue-precipitating condensation product containing at least one sulfonic group and derived from a ketone and a phenol not substituted in para-position to the hydroxyl group, with a condensation product derived from urea and formaldehyde, tanning agents are produced according to a patent (U. S. 2,035,461) issued to the I.G.

Waterproof for Leather

A process of waterproofing vegetable tanned leather by superficially applying an aqueous solution of a salt chosen from the group consisting of quaternary ammonium salts, quaternary phosphonium salts, and sulfonium salts containing an aliphatic chain of not less than ten carbon atoms is covered by U. S. Pat. 2,038,529 assigned to the I.G.

U. S. Chemical Patents

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Preparation molecular addition compound of calcium sulfate and urea. No. 2,074,880. Colin W. Whittaker and Frank O. Lundstrom, Washington, D. C., to the free use of the Public in the U. S. of America.

Drying apparatus. No. 2,075,506. Joe Crites, Evanston, and Richard F. O'Mara, Chicago, Ill., to Raymond Bros. Impact Pulverizer Co., Chicago, Ill.

Nitrifying superphosphate; by treatment with a nitrifying agent comprising free ammonia and a guanidine salt. No. 2,075,801. Harry A. Curtis, Knoxville, Tenn., to T. V. A., Wilson Dam, Ala.

Preparation fertilizers; treating superphosphate with ammonium nitrate. No. 2,077,171. Edw. W. Harvey, New Brunswick, N. J., and Russell M. Jones, Sheffield, Ala., to Barrett Co., New York City.

Apparatus

Method separating finely divided solid materials of different specific gravity. No. 2,073,952. Claude H. Shepherd, Chicago, Ill.

Utilization of molten material as heat transfer medium. No. 2,074,-529. Maurice H. Arveson, Highland, Ind., to Standard Oil Co. (Ind.), Chicago, Ill.

Cooling and absorption tower. No. 2,074,551. Maurice A. Knight, Akron, O., to Frederick M. Klein, New York City.

Apparatus for effecting a chemical reaction or otherwise treating material. No. 2,074,819. Jos. W. Weitzenkorn, Pittsburgh, Pa.

Apparatus for preheating coal before coking. No. 2,074,881. Albin Gottlieb Witting, Gary, Ind.

Apparatus for producing high strength calcined gypsum. No. 2,074,-937. Wilbur S. Randel, Cheshire, Mass., Manvel C. Dailey, Maywood, Ill., and Wm. M. McNeil, Warren, O., to U. S. Gypsum Co., Chicago, Ill.

Apparatus for solvent extraction. No. 2,074,988. Wm. J. O'Brien and Roy C. Brett to Glidden Co., all of Cleveland, O.

Apparatus for treating gaseous fluids. No. 2,075,193. Kurt A. Gerson, Kilburn, London, England.

Separator for liquids and solids. No. 2,075,353. Wm. Robt. Mobley, Miami, Fla.

Apparatus for dispersing materials. No. 2,075,403. Samuel K. Nester to Geneva Processes, Inc., both of Geneva, N. Y.

Apparatus for cleaning coal or foreign matter. No. 2,075,593. Louis Sveinsson, Shamokin, Pa.

Method reducing corrosion of ferrous materials subject to attack by water containing CO_2, oxygen, and combined sulfur, by maintaining a small concentration of caustic treated casein therein. No. 2,075,976. Wm. S. Calcott, Penns Grove, N. J., to du Pont, Wilmington, Del.

Process of compressing gases. No. 2,075,984. Stanley L. Handforth, Woodbury, N. J., to du Pont, Wilmington, Del.

Process and apparatus for extraction of products in solution by means of solvents. No. 2,076,126. Henri Martin Guinot, Melle, Deux-Sevres, France.

Pulverizing mill. No. 2,076,288. Ervin G. Bailey, Easton, Pa., Perry R. Cassidy, Short Hills, and Ralph M. Hardgrove, Westfield, N. J., to Babcock & Wilcox Co., Newark, N. J.

Method of and apparatus for dissolving material. No. 2,076,478. Frank Urbane Neat to Jefferson Island Salt Co., both of Louisville, Ky.

Apparatus for measuring, recording and controlling dilute dust concentrations. Nos. 2,076,553-4. Philip Drinker, Brookline, and Willis Gilpin Hazard, Jamaica Plain, Mass.

Apparatus for determining the consistency of materials. No. 2,076,-591. Edmund O. Rhodes and Ernest W. Volkmann, Pittsburgh, and Chas. T. Barker, Mt. Lebanon, Pa., to Koppers Co., corporation of Del.

Apparatus for revivifying charcoal. No. 2,076,647. Boyd M. Johnson, Metuchen, N. J., to Carborundum Co., Niagara Falls, N. Y.

Furnace for heating fluids. No. 2,076,855. Lev A. Mekler to Universal Oil Products Co., both of Chicago, Ill.

Dehydrating apparatus. No. 2,076,873. Gerald D. Arnold, Wauwatosa, Wis.

Production calcined lime brick; using pulverized calcined lime and a dry, pulverulent oxide of a metal. No. 2,076,883. Jules Ernould, Longwy, France, to Societe des Hauts Fourneaux de la Chiers, corporation of France.

Production dolomite brick; pulverizing dolomite in dry state and mixing therewith a small amount of dry, pulverulent oxide of a metal. No. 2,076,884. Jules Ernould, Longwy, France, to Societe des Hauts Fourneaux de la Chiers, corporation of France.

CO_2 extinguishing system. No. 2,077,158. Carlisle F. Smith, Elmira, N. Y., to American-La France Foamite Corp., corporation of New York.

Cellulose

Production transparent, flexible, durable cellulosic pellicles. No. 2,074,-336. Frederick C. King, Buffalo, N. Y., to du Pont, Wilmington, Del.

Manufacture cellulose from natural cellulosic materials. No. 2,074,-339. Geo. W. Miles, Boston, Mass., to Celanese Corp. of America, corporation of Del.

Preparation cellulosic pellicle from an aqueous alkaline cellulosic dispersion coagulated in an acid coagulating bath containing a water-soluble amide. No. 2,074,349. Wm. Frederick Underwood, Buffalo, N. Y., to du Pont, Wilmington, Del.

Method impregnating cellulosic materials and product thereof. No. 2,075,328. Gerard A. Albert, Kennett Square, Pa., to National Vulcanized Fibre Co., Wilmington, Del.

Patents digested include issues of the "Patent Gazette," middle March 16 through April 13 inclusive.

Preparation of an organic acid ester of cellulose in fibrous form. No. 2,076,181. Fred J. Hopkinson and Chas. R. Fordyce, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Treatment cellulosic material with a solution of an alkali metal hydroxide containing a salt of a carboxylic ether acid to exert a mercerizing action. No. 2,076,303. Donald H. Powers, Moorestown, N. J., and Harold W. Stiegler, Bristol, Pa., to Rohm & Haas Co., Phila., Pa.

Preparation propionic acid ester of cellulose. No. 2,076,555. Robt. E. Fothergill to du Pont, both of Wilmington, Del.

Preparation cellulose xanthate solutions. Nos. 2,076,594-6. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Preparation viscose syrup; using water, caustic soda, cellulose, and carbon bisulfide in process. No. 2,076,595. Geo. A. Richter to Brown Co., both of Berlin, N. H.

Preparation aralkyl ethers of cellulose; treating cellulose with an aralkyl halide containing an aqueous alkali solution emulsified by the action of an emulsifying agent. No. 2,077,066. Eugene J. Lorand to Hercules Powder Co., both of Wilmington, Del.

Process for accelerated preliminary maturing of alkali cellulose. No. 2,077,164. Rudolf Brandes, Chemnitz, Germany.

Coal Tar Chemicals

Preparation neutral alkyl glycollate ester of a monoalkyl phthalate wherein each of said alkyl groups is saturated. No. 2,073,937. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Preparation aryl mercury hydroxy mononuclear aromatic carboxylates. No. 2,074,040. Carl N. Andersen, Wellesley Hills, Mass., to Lever Bros. Co., corporation of Me.

Preparation a nitroso-phenol compound; subjecting a phenol free from reactive substituents to the action of NOCl in an aqueous medium. No. 2,074,127. Wendell W. Moyer, Syracuse, N. Y., to Solvay Process Co., New York City.

Production benzanthrone derivatives; dihalogen-Bz2-chlorobenzanthrones. No. 2,074,181. Isidor Morris Heilbron, Manchester, England, and Francis Irving, Grangemouth, Scotland, to Imperial Chemical Industries, Ltd., London, England.

Production anthraquinone compounds. No. 2,074,306. Myron S. Whelen, Milwaukee, Wis., to du Pont, Wilmington, Del.

Preparation anthraquinonedisulfonic acids. No. 2,074,307. Myron S. Whelen, Milwaukee, Wis., to du Pont, Wilmington, Del.

Preparation anthraquinonedisulfonic acids. No. 2,074,309. Alex. J. Wuertz, Carrollville, Wis., to du Pont, Wilmington, Del.

Manufacture brominated pyranthrones; subjecting the pyranthrone to action of bromine in a reaction medium comprising chlorsulfonic acid, sulfuric acid, iodine, and an anhydrous boron compound. No. 2,074,-381. Maurice H. Fleysher and Jas. Ogilvie, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Preparation pure capryl alcohol from mixtures containing capryl alcohol and methyl hexyl ketone. No. 2,074,528. Chester E. Andrews, Overbrook, and Lloyd W. Covert, Phila., Pa., to Rohm & Haas Co., Phila., Pa.

Preparation 3 (N-sodium formaldehyde sulfoxylate) amino-4-hydroxyphenyl-arsonic acid. No. 2,074,757. Geo. W. Raiziss and Abraham I. Kremens, Phila., Pa., to Abbott Labs., N. Chicago, Ill.

Production hydroxyphenylaminoaryls of the pyrene and chrysene series. No. 2,075,393. Walter Hagge, Dessau-in-Anhalt, and Herbert Bach, Bitterfeld, Germany, to General Aniline Works, Inc., New York City.

Preparation compounds of the dibenzanthrone series. Nos. 2,075,455-6. Heinrich Neresheimer and Anton Vilsmeier, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Method retarding deterioration of an oxidizable organic material which tends to deteriorate by absorption of oxygen from the air; by treatment with a diarylamine. No. 2,075,549. Waldo L. Semon, Silver Lake Village, Ohio, to B. F. Goodrich Co., New York City.

Preparation liquid xylylheptadecyl ketones. No. 2,075,765. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago, Ill.

Recovery phthalic anhydride from a hot reaction gas mixture of the type formed by the catalytic vapor phase oxidation of a polynuclear aromatic hydrocarbon. No. 2,076,033. Walter H. Kniskern, Petersburg, Va., to Solvay Process Co., New York City.

Production compositions from coal tar and higher fatty acids. No. 2,077,068. Anderson W. Ralston and Carl W. Christensen to Armour & Co., all of Chicago, Ill.

Coatings

Method and apparatus for coating. No. 2,074,498. Raymond J. Wean to Wean Engineering Co., Inc., both of Warren, O.

Method for continuous production of a rosin acid ester. No. 2,074,963. Harry E. Kaiser, Temple City, Cal., to Hercules Powder Co., Wilmington, Del.

Production acylamino alkyl-aryl ethers and their sulfonation products. No. 2,075,013. Alfred Wm. Baldwin, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Coating composition; shellac substitute consisting of a copal resin in solution in a volatile solvent mixture comprising ethyl alcohol and toluol together with an alkaline compound of metal. No. 2,075,025. Jos. B. Dietz, Roanoke, Va., and Harry G. Stauffer and Edmund F. Oeffinger, Phila., Pa., to du Pont, Wilmington, Del.

Production the anhydride of an organic carboxylic acid; heating mixture of an alkyl ester of said acid with the anhydride of a different carboxylic acid, in presence of an esterification catalyst. No. 2,075,035. Geo. D. Graves to du Pont, both of Wilmington, Del.

Dehydrogenation of aliphatic ethers. No. 2,075,100. Henry Dreyfus, London, England.

Apparatus for applying a liquid coating composition to sheets. No. 2,075,620. Colin Malcolm Mackenzie, Wabash, Ind., to Container Corp. of America, Chicago, Ill.
Black, heat-resisting finish consisting of sodium silicate and filler of black oxide of cobalt and black oxide of iron. No. 2,076,183. Martin Louis Michaud to Metal Finishing Research Corp., both of Detroit, Mich.
Liquid coating composition comprising the resinous product obtained by the reaction of a phenol, a fatty oil, and hexamethylenetetramine in presence of hexalin. No. 2,076,507. Victor H. Turkington, Caldwell, N. J., to Bakelite Corp., New York City.
Process coating an uneven surface with a smooth multiple layer coating. No. 2,076,509. Chas. Hugh Whitelaw, Detroit, Mich., to Cook Paint & Varnish Co., Kansas City, Mo.
Manufacture pigmented protective coatings. No. 2,077,167. Jean Crouet, Saint Just-en-Chaussee, France, to Weeks & Co. (London) Ltd., Middlesex, England.

Dyes, Stains, etc.

Preparation vat dye assistants. No. 2,074,150. Jean G. Kern, Hamburg, N. Y., to National Aniline & Chemical Co., Inc., New York City.
Production anthraquinone dyestuffs. No. 2,074,179. Norman Hulton Haddock, Frank Lodge, and Colin Henry Lumsden, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.
Production insoluble azo dyestuffs; combining diazotized 2:5 methoxy-4-furoylamine-amine-benzol with beta-hydroxy-naphthoic acid orthotoluidide. No. 2,074,186. Eugene A. Markush, Jersey City, N. J., to Pharma Chemical Corp., New York City.
Manufacture azo dyestuffs. No. 2,074,225. Adolf Krebser, Riehen, near Basel, Switzerland, to J. R. Geigy, A. G., Basel, Switzerland.
Manufacture pyrene compounds, soluble in aqueous alkalies, insoluble in water, for the manufacture of dyestuffs. No. 2,074,645. Josef Ebersberger, Leverkusen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.
Production orange disazo dyes. No. 2,075,022. Moses L. Crossley, Plainfield, and Lincoln M. Shafer, Highland Park, N. J., to Calco Chemical Co., Inc., Bound Brook, N. J.
Production monoazo dyestuffs. No. 2,075,076. Paul Zervas, Cologne-Mulheim, and Heinrich Clingestein, Cologne-am-Rhine, Germany, to General Aniline Works, Inc., New York City.
Process and composition for dyeing animal fibers. No. 2,075,371. Fritz Straub, Fritz Grether, and Chas. Graenacher to Society of Chemical Industry in Basle, all of Basel, Switzerland.
Production mordant azo dyestuffs. No. 2,075,743. Max Muller to Durand & Huguenin S. A., both of Basel, Switzerland.
Production sulfur dyes; heating decacyclene with a sulfurizing agent to the reaction temperature. No. 2,076,143. Walter Hagge and Karl Haagen, Dessau in Anhalt, Germany, to General Aniline Works, Inc., New York City.
Production vat dyes; sulfurizing and halogenizing decacyclene in the presence of chlorosulfonic acid. No. 2,076,144. Walter Hagge and Karl Haagen, Dessau in Anhalt, Germany, to General Aniline Works, Inc., New York City.
Dyeing apparatus. No. 2,076,170. Edward J. Abbott to Abbott Machine Co., both of Wilton, N. H.
Production sulfonated arylamino anthraquinone dyestuffs. No. 2,076,-197. Ernest Gutzwiller to Chemical Works formerly Sandoz, both of Basel, Switzerland.
Production mordant azo dyestuffs. No. 2,076,477. Max Muller to Durand & Huguenin S. A., both of Basel, Switzerland.
Production green monoazo dyestuffs. No. 2,076,484. Otto Senn to Chemical Works formerly Sandoz, both of Basel, Switzerland.
Production indigoid vat dyestuff. No. 2,076,872. Werner Zerweck and Eduard Albrecht, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.
Production azo dyestuffs. No. 2,076,921. Hans Schindhelm and Max Schubert, Frankfort-am-Main-Fechenheim, Germany, to General Aniline Works, Inc., New York City.
Production azo dyestuffs insoluble in water. No. 2,077,062. Paul Wolff and Wilhelm Werner, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.
Production polymethine dyestuffs. No. 2,077,063. Paul Wolff, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York City.
Preparation dyestuffs of the anthracene series. No. 2,077,108. Josef Haller, Leverkusen-Wiesdorf, and Georg Rosch, Cologne-Mulheim, Germany, to Durand & Huguenin A.-G., Basel, Switzerland.
Manufacture azo dyestuffs. No. 2,077,322. Daniel Hatt, Rouen, France, to Compagnie Nationale de Matieres Colorantes et Manufactures de Produits Chimiques du Nord Reinies, Etablissements Kuhlmann, Paris, France.

Explosives

Manufacture safety explosive cartridge or borehole charge comprising core of black powder and a sheath comprising a borate. No. 2,075,969. Albert Greville White and Elwyn Jones, Saltcoats, Scotland, to Imperial Chemical Industries, Ltd., London, England.
Production liquid oxygen explosive, using starch in process. No. 2,076,279. Henri Sauvage to l'Air Liquide, Societe Anonyme pour l'Etude & l'Exploitation des Procedes Georges Claude, both of Paris, France.
Production smokeless powder coated with an alkyl phthalyl alkyl glycollate. No. 2,076,772. Ellsworth S. Goodyear, Kenvil, N. J., to Hercules Powder Co., Wilmington, Del.
Projectile for small arms ammunition comprising a lead slug having lubricating oil distributed uniformly throughout. No. 2,076,868. Philip A. Smith, Hamden, Conn., to Winchester Arms Repeating Co., New Haven, Conn.

Fine Chemicals

Preparation alkyl cresols. No. 2,073,995. Geo. W. Raiziss and Le Roy W. Clemence, Phila., Pa., to Abbott Labs., No. Chicago, Ill.
Preparation alkyl derivative of β-naphthol, wherein the alkyl group is branched and contains from 5 to 6 carbon atoms, said derivative having high germicidal effects combined with low toxicity. No. 2,073,996. Geo. W. Raiziss and Le Roy W. Clemence, Phila., Pa., to Abbott Labs., No. Chicago, Ill.
Preparation alkyl derivative of an α-naphthol wherein the alkyl group contains from 4 to 6 carbon atoms. No. 2,073,997. Geo. W. Raiziss and Le Roy W. Clemence, Phila., Pa., to Abbott Labs., No. Chicago, Ill.
Photographic material for production of dyestuff images. No. 2,074,-259. Bela Gaspar, Berlin, Germany.
Production acetaldehyde from acetylene; conducting acetylene into a dilute acid containing metallic mercury and an oxidizing agent, maintaining temperature between 92° C. and the B. P. of the reaction liquid. No. 2,074,619. Paul Roth, Heinrich Elvert, and Franz Steinberger, Frankfort-am-Main-Hochst, Germany, to I. G., Frankfort-am-Main, Germany.
Chemical method treating photographs to color them. No. 2,074,858. Alfred C. Raffo, Grantwood, N. J.
Manufacture of aliphatic anhydrides. No. 2,075,026. Henry Dreyfus, London, England, and Clifford Ivan Haney, Drummondville, Que., Canada, to Celanese Corp. of America.
Production of a coloring matter of the phthalocyanine series; by heating an ortho-halogenbenzamide with a copper cyanide. No. 2,075,043. Reginald Patrick Linstead and Arthur Reginald Lowe, London, Isidor Morris Heilbron, Manchester, and Francis Irving, Grangemouth, England, to Imperial Chemical Industries, Ltd., London, England.
Preparation photographic emulsion containing supersensitized pinacyanol. No. 2,075,046. Chas. E. K. Mees, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.
Production photographic emulsion containing supersensitized pseudocyanines. No. 2,075,047. Chas. E. K. Mees, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.
Preparation photographic emulsion containing supersensitized carbocyanines. No. 2,075,048. Chas. E. K. Mees, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.
Treatment of carbonaceous materials with reducing gases. No. 2,075,-101. Henry Dreyfus, London, England.
Manufacture mixed esters. No. 2,075,107. Ralph B. Frazier, Swissvale, Pa., to Union Carbide & Carbon Corp., New York City.
Preparation acylated polyalkylene polyamines. No. 2,075,109. Hermann Friedrich, Leverkusen-I. G. Werk, Germany, to I. G., Frankfort-am-Main, Germany.
Antihalation layers for photographic plates and films. Nos. 2,075,-144-5. Wilhelm Schneider, Dessau, Germany, to Agfa Ansco Corp., Binghamton, N. Y.
Production colored photographic materials. No. 2,075,190. Bela Gaspar, Brussels, Belgium.
Production colored photographs. No. 2,075,191. Bela Gaspar, Brussels, Belgium.
Purification of alcohols; by contact with the nitrate of an easily reducible metal, such contact being effected in absence of alkali. No. 2,075,205. Alfred E. Jurist and Louis W. Green, Brooklyn, N. Y., to E. R. Squibb & Sons, Inc., New York City.
Production of siccatives from organic acids containing at least 7 carbon atoms. No. 2,075,230. Herman Schatz, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.
Production halogenated ethers. Nos. 2,075,312-3. Fritz Straus, Berlin, Germany, to I. G., Frankfort-am-Main, Germany.
Manufacture sulfuric acid esters of unsaturated alcohols. No. 2,075,-914. Arnon O. Snoddy and Wilfred S. Martin to Procter & Gamble Co., all of Cincinnati, Ohio.
Production saturated alcohols of the cyclopentano phenanthrene series. No. 2,076,098. Walter Schoeller, Berlin-Westend, and Friedrich Hildebrandt, Hohen Neuendorf, near Berlin, Germany, to Schering-Kahlbaum A.-G., Berlin, Germany.
Production carboxylic acid esters of aliphatic alcohols having less than 4 carbon atoms. No. 2,076,111. Wm. J. Bannister to Commercial Solvents Corp., both of Terre Haute, Ind.
Preparation acylaminoaryl phenylcinchoninates. No. 2,076,706. Walter G. Christiansen, Glen Ridge, N. J., and Sidney E. Harris, Lynbrook, N. Y., to E. R. Squibb & Sons, New York City.
Preparation aryl-phenyl cinchoninates. No. 2,076,707. Walter G. Christiansen, Glen Ridge, N. J., and Sidney E. Harris, Lynbrook, N. Y., to E. R. Squibb & Sons, New York City.
Preparation derivatives of 1-phenyl-2.3-dimethyl-4-amino-5-pyrazolone. No. 2,076,714. Louis Freedman, Albany, N. Y., to Winthrop Chemical Co., Inc., New York City.
Products obtainable from high molecular carbohydrates; using hydrogen peroxide in process. No. 2,076,889. Emil Hees, Wiesbaden, Germany, to Winthrop Chemical Co., Inc., New York City.
Preparation basically substituted acridine compounds. No. 2,077,249. Fritz Mietzsch, Wuppertal-Elberfeld, and Hans Mauss, Wuppertal-Barman, Germany, to Winthrop Chemical Co., Inc., New York City.
Extraction halogen from a fluid medium; allowing fluid to come in contact with a condensation product of a polyvinyl alcohol and an aldehyde. No. 2,077,298. George E. Zeiger, Montreuil sous Bois Seine, France, to Eastman Kodak Co., Jersey City, N. J.

Glass, Ceramics

Apparatus for applying facings of synthetic resin to opposite edges of glass building units. No. 2,075,435. David E. Gray to Corning Glass Works, both of Corning, N. Y.
Method coloring glass red, using a copper staining salt in process. No. 2,075,446. Edw. C. Leibig to Corning Glass Works, both of Corning, N. Y.
Manufacture glass closure for metal containers using metallizing composition in process. No. 2,075,477. Rowland D. Smith to Corning Glass Works, both of Corning, N. Y.
Manufacture safety glass, using interposed layer of synthetic resin. No. 2,075,667. James H. Sherts, Tarentum, Pa., to Pittsburgh Plate Glass Co., corporation of Pa

Industrial and Heavy Chemicals

Apparatus for producing dehydrated and crystalline anhydrous sodium tetraborate. No. 2,073,827. Leroy G. Black to American Potash & Chemical Corp., both of Trona, Cal.
Manufacture copper sulfate. No. 2,073,977. Marcel Serciron, Dourdan, France.
Manufacture borides; grinding metal and purified boron together. No. 2,073,826. Clarence W. Balke, Highland Park, Ill., to Ramet Corp. of America, North Chicago, Ill.
Purification commercial hydrogen gas; removing the CO therein by converting it into methane in presence of a catalyst. No. 2,074,311. Harold E. Moore to Capital City Products Co., both of Columbus, O.
Method continuously purifying comminuted filter clay contaminated with carbonaceous material. No. 2,074,456. Robt. A. Carleton, Brooklyn, N. Y.; to National Electric Heating Co., Inc., New York City.
Preparation coloring material; heating mica containing iron at temperatures about 750° C., to develop a golden to bronze color in mica. No. 2,074,499. Davidson C. Wysor, Ridgewood, N. J., to General Chemical Co., New York City.
Manufacture liquid oxygen cartridge comprising an open end casing of material impervious to liquid oxygen. No. 2,074,553. Don B. McCloud, Carbondale, Ill.
Manufacture of a magnesia-insulated multiple conductor cable. No. 2,074,777. Marcel Marie Joseph Eugene Coupier, Paris, France.
Method for reducing porosity of a carbon body, establishing a flow of a dilute silicate solution through said body and increasing concentration until finally a concentrated solution is used. No. 2,074,885. **Harry**

Bender, Antioch, Cal., to Great Western Electro-Chemical Co., corporation of Cal.
Method and apparatus for manufacture sulfuric acid. No. 2,075,075. Fred C. Zeisberg to du Pont, both of Wilmington, Del.
Recovery of chlorates by selective extraction with acetone. No. 2,075,179. Geo. Lewis Cunningham, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.
Production phosphorus pentoxide. No. 2,075,212. Chas. L. Levermore, Rockville Center, and Robt. E. Vivian, New York City, to General Chemical Co., New York City.
Preparation mixture of mercaptans of the higher oxygenated organic compounds obtained from the catalytic hydrogenation of carbon oxides. No. 2,075,295. Donald J. Loder to du Pont, both of Wilmington, Del.
Preparation tertiary amines of the benzene series. No. 2,075,347. Hans Lange, Dessau-in-Anhalt, Germany, to General Aniline Works, Inc., New York City.
Production sodium aluminum fluoride. No. 2,075,370. Walter Strathmeyer, Oppau, Germany, to I. G., Frankfort-am-Main, Germany.
Preparation material which fluoresces under stimulation of X-rays but shows no appreciable after-phosphorescence; comprising zinc sulfide, cadmium sulfide, silver, manganese, and nickel. No. 2,075,399. Leonard Angelo Levy and Donald Willoughby West, London, England.
Process and apparatus for production of nitrogen oxides by the synthesis of ammonia from its elements. No. 2,075,510. John W. Davis, Prince George County, Va., to Solvay Process Co., New York City.
Stabilization alcoholic beverages by treatment with sodium hexa metaphosphate. No. 2,075,653. Allen G. Libbey, Somerville, Mass.
Method retarding oxidation of organic materials having an oleaginous constituent normally subject to oxidation. No. 2,075,806. Albert K. Epstein and Benjamin R. Harris, Chicago, Ill.
Oleaginous stabilization by the ester of glycerin with phosphoric acid and higher fatty acid. No. 2,075,807. Albert K. Epstein and Benj. R. Harris, Chicago, Ill.
Apparatus for production sulfur dioxide. No. 2,075,823. Edwin J. Mullen, New Rochelle, N. Y., and Chas. A. Gallagher, California, Pa., to General Chemical Co., New York City.
Preparation quaternary ammonium compounds. No. 2,075,958. Henry Alfred Piggott, Blackley, England, to Imperial Chemical Industries, Ltd., London, England.
Production unsaturated alcohol having an iodine number approximating 85 to 90 first step of which comprises chilling sperm oil to approximately 10°C. No. 2,075,963. Walther Schrauth, Berlin-Dahlem, Germany, to "Unichem" Chemikalien Handels A.-G., Zurich, Switzerland.
Manufacture phenyl mercury acetate and phenyl mercury hydroxide. No. 2,075,971. Louis S. Bake, Penns Grove, N. J., to du Pont, Wilmington, Del.
Process for dehydration of acetic acid and other lower fatty acids. No. 2,076,184. Donald F. Othmer, Brooklyn, N. Y., to Tennessee Eastman Corp., Kingsport, Tenn.
Process for hydrolyzing the absorbed olefine content of an acid liquor in a closed unit. No. 2,076,213. Gerald Henry van de Griendt, Oakland, Cal., to Shell Development Co., San Francisco, Cal.
Preparation carboxylic acid amides of sulfonated aromatic carboxylic acids. No. 2,076,217. Otto Albrecht to Society of Chemical Industry in Basle, both of Basel, Switzerland.
Preparation liquid chlorine at atmospheric pressure. No. 2,076,235. John W. Hayes and Alois J. Kallfelz, Syracuse, N. Y., to Solvay Process Co., New York City.
Production cellular insulating materials; by converting solutions of condensation products of a urea and an aldehyde into a foam-like mass. No. 2,076,295. Alfred Curs and Hans Wolf, Ludwigshafen-am-Rhine, Germany, to Plaskon Co., Inc., Toledo, Ohio.
Preparation oxyfluoride of nitrogen. No. 2,076,364. Geo. H. Cady, Wadsworth, O.
Purification of halogenated organic compounds. No. 2,076,430. Ernest R. Hanson, Bloomfield, and Sandford Brown, Montclair, N. J., to Halowax Corp., New York City.
Production basic exchange material of high operating exchange value, consisting of altered glauconite granules of increased surface porosity produced by partial extraction of basic constituents with partial replacement by addition of soda and alumina. No. 2,076,443. Wm. McAfee, Mount Holly, N. J., to Permutit Co., New York City.
Preparation sulfonation products of hydro-abietyl alcohol. No. 2,076,-563. Clyde O. Henke, Wilmington, Del., and Milton A. Prahl, Milwaukee, Wis., to du Pont, Wilmington, Del.
Removal color and aldehyde from alcohol-free ketone-aldehyde-hydrocarbon-containing mixture. No. 2,076,607. John C. Woodhouse, Cragmere, Del., to du Pont, Wilmington, Del.
Manufacture granular activated carbon for use in purification of aqueous mediums. No. 2,076,645. Heber A. Ingols, Wilmington, and Paul F. Pie, Jr., Newark, Del., to Darco Corp., Wilmington, Del.
Preparation sinkable granular activated carbon for use in purification of aqueous mediums from non-sinkable granular activated carbon having a block density less than 1.0 grams per cubic centimeter. No. 2,076,-646. Heber A. Ingols, Wilmington, and Paul F. Pie, Jr., Newark, Del., to Darco Corp., Wilmington, Del.
Production sulfur-containing terpene compound by reacting an unsaturated terpene compound with hydrogen sulfide in presence of a catalyst. No. 2,076,875. Jos. N. Borglin, Wilmington, and Emil Ott, Elsmere, Del., to Hercules Powder Co., Wilmington, Del.
Treatment anodes of condensers of the electrolytic type; forming film and using dilute sulfuric acid in process. No. 2,076,904. Julius Edgar Lilienfeld, Winchester Mass., to Magnavox Co., Ft. Wayne, Ind.
Production hydrocyanic acid; reacting mixture containing nitric oxide, a gaseous hydrocarbon, water vapor, oxygen and nitrogen in presence of a platinum-rhodium catalyst. No. 2,076,953. Burritt S. Lacy, Niagara Falls, N. Y., to du Pont, Wilmington, Del.
Production sulfate esters of 2-butyloctanol, same being an oily liquid having acid properties. No. 2,077,005. Granville Perkins and Walter J. Toussaint, So. Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.
Sulfur recovery process. No. 2,077,028. Raymond F. Bacon, Bronxville, N. Y., and Wilber Judson, Newgulf, Texas.

Metals and Ores, Electroplating, etc.

Production austenitic ferrous alloys. No. 2,073,901. Harold D. Newell, Beaver Falls, Pa., to Babcock & Wilcox Tube Co., West Mayfield, Pa.
Manufacture articles of cobalt-chromium-tungsten alloys. No. 2,074,-007. Wm. A. Wissler, Flushing, N. Y., to Union Carbide & Carbon Corp., New York City.
Process treating ores. No. 2,074,013. Wilson Bradley, deceased, late of Deerwood, Minn., by Agnes Cornelison Bradley, executrix, Duluth, Minn., to Bradley Process Corp., Wilmington, Del.
Process and apparatus for reducing the carbon content in pig iron. No. 2,074,164. Edw. L. Clair, Toledo, O., to Interlake Iron Corp., Chicago, Ill.
Preparation metallic sulfates from sulfide ores, and the like. No. 2,074,210. John Henry Calbeck, Columbus, O., to American Zinc, Lead & Smelting Co., St. Louis, Mo.
Method and apparatus for production of metallic coatings on electrically non-conducting substances by the thermal vaporization of metals in vacuo. No. 2,074,281. Ludwig August Sommer, Berlin-Dahlem, Germany.
Apparatus for making composite metals. No. 2,074,296. Henry B. Allen to Henry Disston & Sons, Inc., both of Phila., Pa.
Method gold plating stainless steel articles; using free hydrocyanic acid in process; No. 20,306. Reissue. Hiram S. Lukens, Phila., Pa., to C. Howard Hunt Pen Co., Camden, N. J.
Flotation apparatus. No. 2,074,403. Max Kraut, San Francisco, Cal., to Pan-American Engineering Corp., Ltd., Berkeley, Cal.
Production tungsten base alloy for points of gold nibs. No. 2,074,474. Alfred Jedele to W. C. Heraeus Gesellschaft mit beschrankter Haftung, both of Hanau-am-Main, Germany.
Production heat-resisting, permanently ductile alloy free from embrittlement, having following elements only: copper, nickel, iron, manganese. No. 2,074,604. John W. Bolton, Cincinnati, and Oscar E. Harder, Columbus, O., to Lunkenheimer Co., Cincinnati, O.
Combined inert gas recirculation and tar heater operation. No. 2,074,-689. Geo. Thomas Gambrill, Jr., Birmingham, Ala., to Barrett Co., New York City.
Process for froth flotation of ores. No. 2,074,699. Samuel Lenher, Jos. Lincoln Gillson, and Chas. Titus Mentzer, Jr., to du Pont, all of Wilmington, Del.
Production metals by smelting compounds thereof. No. 2,074,726. Fritz Hansgirg, Radenthein, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.
Apparatus for coating sheet metal. No. 2,074,798. James E. McElhaney and Robt. Stoker, Vandergrift, Pa., to American Sheet & Tin Plate Co., corporation of N. J.
Process for extraction of cadmium. No. 2,074,806. Aladar Por to "Berzelius" Metallhutten-Gesellschaft mit beschrankter Haftung, both of Duisburg-Wanheim, Germany.
Production hard alloy; consisting of tungsten, carbide, titanium carbide, titanium nitride, and a binder for said carbides and nitride. No. 2,074,847. Louis Edmond Lemaigre, Paris, France, to General Electric Co., Schenectady, N. Y.
Protecting surfaces of metal articles from corrosion by coating with a thin layer of an alloy containing tin and alloyed phosphorus. No. 2,074,-848. Frank M. Levy to Mueller Brass Co., both of Port Huron, Mich.
Lead extrusion apparatus. No. 2,074,856. Carl A. Piercy, Ballston Lake, and Eugene L. Crandall, Scotia, N. Y., to General Electric Co., Schenectady, N. Y.
Treatment metals; using silicon and vitreous enamel in process. No. 2,074,954. Harvey Ross Belding, Vandergrift, Pa., to American Sheet & Tin Plate Co., corporation of N. J.
Production alloy composed of palladium and nickel having from 5 to 16% nickel content. No. 2,074,996. Sidney Cohn to Sigmund Cohn, both of New York City.
Production copper base alloy consisting of silicon, aluminum, and copper. No. 2,075,002. Daniel R. Hull, Watertown, Conn., to American Brass Co., Waterbury, Conn.
Production copper base alloy, composed of silicon, aluminum, and copper. No. 2,075,003. Daniel R. Hull, Watertown, Conn.
Production copper base alloy characterized by free cutting properties and resistance to corrosion; consisting of silicon, zinc, lead, tin, and copper. No. 2,075,004. Wm. H. Bassett, deceased, late of Cheshire, Conn., by Sarah H. Bassett, Cheshire, Conn., executrix; to American Brass Co., Waterbury, Conn.
Production copper-silicon-zinc-lead alloy, characterized by free cutting properties and resistance to corrosion. No. 2,075,005. Wm. H. Bassett, deceased, late of Cheshire, Conn., by Sarah H. Bassett, Cheshire, Conn., to American Brass Co., Waterbury, Conn.
Copper base alloy which is workable and characterized by free cutting properties and resistance to corrosion, comprising silicon, manganese, lead, and copper. No. 2,075,014. Wm. H. Bassett, Cheshire, Conn., to American Brass Co., Waterbury, Conn.
Production aluminum base alloy having low coefficient of expansion and high thermal conductivity, comprising silicon, tin, and aluminum. No. 2,075,089. Walter Bonsack, Cleveland Heights, and John G. Frost, Cleveland, O., to National Smelting Co., Cleveland, O.
Production aluminum base alloy having a low coefficient of expansion and high thermal conductivity, comprising silicon, tin, magnesium, zinc, and aluminum. No. 2,075,090. Walter Bonsack, Cleveland Heights, and John G. Frost, Cleveland, O., to National Smelting Co., Cleveland, O.
Production aluminum base alloy having low coefficient of expansion and high thermal conductivity, comprising silicon, tin, zinc, and aluminum. No. 2,075,091. Walter Bonsack, Cleveland Heights, and John G. Frost, to National Smelting Co., Cleveland, O.
Production metals and utilization thereof. No. 2,075,150. Justin F. Wait, New York City.
Process for agglomeration of fine iron ores. No. 2,075,210. Eugen Kugener, Neunkirchen/Saar, Germany.
Production magnetizable alloys. No. 2,075,283. Albert Heinzel, Oppau, and Franz Duftschmid, Heidelberg, Germany, to I. G., Frankfort-am-Main, Germany.
Method and apparatus for electrodeposition of metal. Nos. 2,075,331-2. Frank L. Antisell, Wilkinsburg, Pa., to Copperweld Steel Co., Glassport, Pa.
Apparatus for and method of surfacing metallic rolls for rolling metals. No. 2,075,394. Clarence W. Hazlett, Greenwich, Conn.
Manufacture porous bronze matrix. No. 2,075,444. Roland P. Koehring, Dayton, Ohio, to General Motors Corp., Detroit, Mich.
Production alloy composed of copper, manganese, and cadmium. No. 2,075,509. Chas. H. Davis, Cheshire, and Elmer L. Munson, Naugatuck, Conn., to American Brass Co., Waterbury, Conn.
Production machinable aluminum base alloy having low coefficient of thermal expansion and high thermal conductivity, comprising silicon, tin, magnesium, and aluminum. No. 2,075,517. John G. G. Frost and Walter Bonsack to National Smelting Co., all of Cleveland, Ohio.
Process for electroplating zinc; using an aqueous solution containing zinc cyanide, alkali metal cyanide, and an alkalining agent. No. 2,075,623. Floyd F. Oplinger, Niagara Falls, N. Y., to du Pont, Wilmington, Del.
Electrolytic apparatus. No. 2,075,688. Arnold Ewald Zdansky, Berlin-Schoneberg, Germany, to Bamag-Meguin Aktiengesellschaft, Berlin, Germany.
Production shaped bodies from an alloy containing an auxiliary metal of the iron group, titanium carbide, and tungsten carbide. No. 2,075,742. Kurt Moers, Berlin-Steglitz, Germany, to General Electric Co., Schenectady, N. Y.
Protection metal surfaces against corrosion by treatment with a ketonic material. No. 2,075,757. Victor Conquest to Armour & Co., both of Chicago, Ill.
Method coating iron, steel or steel alloys. No. 2,075,879. Cleburne

A. Basore and Daniel T. Jones, Auburn, Ala., to Chemical Research & Development Co., Birmingham, Ala.

Method of and apparatus for heat treating rails. Nos. 2,075,982-3. Harry S. George, Massapequa, N. Y., to Union Carbide & Carbon Corp., New York City.

Production alloy containing carbon, chromium, molybdenum, copper, manganese, lead, and iron. No. 2,075,990. Thos. Daniel Kelly, Wallington, England.

Manufacture pure beryllium metal; by forming fused mixture of sodium-potassium and beryllium chlorides, and introducing metallic magnesium into this mixture. No. 2,076,067. Hugh S. Cooper, Cleveland Heights, Ohio, to Cooper Products, Inc., Cleveland, Ohio.

Recovery zirconium oxide. No. 2,076,080. Henri George, Paris, and Roger Lambert, Levallois-Perret, France, to Societe Anonyme des Manufactures des Glaces & Produits Chimiques de Saint-Gobain, Chauny & Cirey, Paris, France.

Production cobalt steel, using cobalt, carbon, silicon, manganese, chromium, tungsten, and iron, also deoxidizing agent. No. 2,076,250. Walter E. Remmers and Kenneth L. Scott, Western Springs, Ill., to Western Electric Co., Inc., New York City.

Production aluminum alloy consisting of Cu, Fe, and aluminum. No. 2,076,281. Hans Steudel and Hans Wiechell, Dessau, Germany, to Junker Flugzeug-und-Motorenwerke Aktiengesellschaft, Dessau, Germany.

Cast alloy consisting of molybdenum and vanadium carbides, and a metal of the iron group. No. 2,076,366. Hugh S. Cooper, Cleveland, O., to General Electric Co., Schenectady, N. Y.

Manufacture tungsten bodies of large crystal structure. No. 2,076,381. Theo. Millner, Upjest, and Paul Tury, Budapest, Hungary, to General Electric Co., Schenectady, N. Y.

Process for improving magnetic properties of silicon steel. No. 2,076,383. Franz Pawlek, Berlin-Niederschoneweide, and Otto Dahl, Berlin-Friedenau, Germany, to General Electric Co., Schenectady, N. Y.

Production free cutting alloys. Nos. 2,076,567-8-9-70-1-2-3-4-5-6-7-8-9-580. Louis W. Kempf and Walter A. Dean, Cleveland, O., to Aluminum Co. of America, Pittsburgh, Pa.

Recovery tellurium from alkaline slags. No. 2,076,738. Oliver C. Martin, Plainfield, N. J., and Chas. W. Clark, Pointe aux Trembles, Quebec, Canada.

Apparatus for refining lead, and removing arsenic, antimony, tin, and zinc. No. 2,076,800. Hermann Thummel, Buenos Aires, Argentina.

Production rustless iron. No. 2,076,885. Alex L. Feild to Rustless Iron & Steel Corp., both of Balto., Md.

Electrolytic iron manufacture. No. 2,076,909. Benjamin Miller and Colin G. Fink, New York City, to Patents Corp. of America, Jersey City, N. J.

Production hard metal alloys from pulverulent material. No. 2,076,952. Anton Kratky, Vienna, Austria.

Recovery tungsten from its ores in the form of tungsten oxide. No. 2,077,073. Manley L. Ross, Niagara Falls, N. Y., to du Pont, Wilmington, Del.

Production ferrous alloys. Nos. 2,077,116-7. Carl F. Lauenstein, Indianapolis, Ind., to Link-Belt Co., Chicago, Ill.

Production hard metal alloy. No. 2,077,239. Josef Hinnüber, Essen, Germany to General Electric Co., Schenectady, N. Y.

Naval Stores

Method raising melting point of rosin by treatment with a metallic chloride. No. 2,074,192. Paul Schnorf, Wiesli, Switzerland, to Hercules Powder Co., Wilmington, Del.

Paper and Pulp

Removal coloring matter from wood pulp; by treatment with a liquor containing an emulsifying agent and an alkali. No. 2,074,473. Georg Jayme to Canadian International Paper Co., both of Hawkesbury, Ont., Canada.

Method and device for forming paper. No. 2,074,705. Lora E. Poole, Anderson, Ind., to General Motors Corp., Detroit, Mich.

Manufacture paper treated with the resinous reaction product of an unpolymerizable polyhydric phenol and an organic polyhalide. No. 2,075,333. Jas. Augustus Arvin to du Pont, both of Wilmington, Del.

Production safety paper having a light, normally imperceptible surface application comprising dehydro-thio-para-toluidine. No. 2,075,538. John Wallace Neff, New Rochelle, N. Y., to Milton C. Johnson Co., New York City.

Preparation parchmentized fabric. No. 2,075,695. Albert Bodmer, Wattwil, Switzerland, to Heberlein Patent Corp., New York City.

Manufacture creped sheets; coating one side of flexible sheet material with a heat-resistant coating and coating other side with a heat-plastic adhesive. No. 2,075,836. Allen L. Spafford, Cloquet, Minn., to Paper Service Co., Cincinnati, O.

Method reenforcing paper; using adhesive and glycerin in process. No. 2,076,343. Ferdinand W. Humphner, Oak Park, Ill., to Mid-States Gummed Paper Co., Chicago, Ill.

Apparatus for drying of paper or fabrics. No. 2,076,415. Frank W. Partsch, Jackson Heights, N. Y., to J. O. Ross Engineering Corp., New York City.

Apparatus for disintegrating paper making material. No. 2,076,899. Marcel Lamort to E. et M. Lamort Fils, both of Vitry-le-Francois, France.

Method of attaining improved felting of the fibers in paper pulp on the wet part of paper and board making machines. No. 2,076,991. Sigbjorn Paul Herbert Ebbinghaus Holgersson, Storvik, and Wm. Anders Eugen Tibell, Molndal, Sweden.

Manufacture paper, comprising a laminated paper-like web. Nos. 2,077,016-7. Elmer C. Schacht to Behr-Manning Corp., both of Troy, N. Y.

Process reclaiming fiber from waste paper. No. 2,077,059. Francis H. Snyder and Stanley F. M. Maclaren, to Snyder-Maclaren Processes, Inc., all of New York City.

Petroleum and Petroleum Chemicals

Extreme pressure lubricating compositions; comprising a lubricating oil and an organic derivative of an organic thio acid. No. 2,073,841. Robt. L. Humphreys and Bruce B. Farrington, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco, Cal.

Cracking process in manufacture of gasoline. No. 2,073,934. Eugene C. Herthel, Flossmoor, Ill., to Sinclair Refining Co., New York City.

Treatment hydrocarbons. No. 2,073,953. Horace M. Weir and Richard B. Chillas, Jr., to Atlantic Refining Co., all of Phila, Pa.

Treatment hydrocarbon oils containing unsaturated hydrocarbons with hydrogen in presence of an alkali metal hydrocarbide. No. 2,073,973. Anthony M. Muckenfuss, Melrose, Fla., to du Pont, Wilmington, Del.

Production lubricating oil adapted for low power consumption and leakage, comprising a mineral oil lubricating oil and an oil soluble linear polymer of isobutylene having a molecular weight in excess of 30,000. No. 2,074,039. John C. Zimmer, Elizabeth, N. J., and Ejnar W. Carlson, Roselle Park, N. J., to Standard Oil Development Co., corporation of Del.

Method for decomposing sludge material derived from sulfuric acid treatment of hydrocarbon oils. No. 2,074,061. Edwin J. Mullen, New Rochelle, N. Y., to General Chemical Co., New York City.

Process and apparatus for pressure distillation. No. 2,074,120. David G. Brandt, Westfield, N. J., to Doherty Research Co., New York City.

High pressure lubricant compressor. No. 2,074,143. Ernest W. Davis, Oak Park, Ill., to Stewart-Warner Corp., Chicago, Ill.

Reagent and process for treating crude oils; desalting and demulsifying reagent comprising caustic soda, sodium acetate, alcohol, glycerin, and water. No. 2,074,183. Paul R. Hershman to Petro Chemical Co., both of Chicago, Ill.

Hydrocarbon oil conversion. No. 2,074,196. Harold C. Weber, Milton, and Wm. H. McAdams, Newton, Mass., to Universal Oil Products Co., Chicago, Ill.

Apparatus for treatment hydrocarbon oil. No. 2,074,198. Jos. G. Alther to Universal Oil Products Co., both of Chicago, Ill.

Solvent refining of lubricating oil. No. 2,074,254. Richard J. Dearborn, Summit, and Wm. P. Gee, Plainfield, N. J., to Texas Co., New York City.

Production hydrocarbon oils and hydrocarbon type solvents having a blue-green to orange and red fluorescence. No. 2,074,288. John M. Tinker, So. Milwaukee, and Viktor M. Weinmayr, Milwaukee, Wis., to du Pont, Wilmington, Del.

Production lubrication consisting of mineral oil and a halogenated higher fatty acid of the aliphatic series. No. 2,074,338. Bert H. Lincoln and Alfred Henriksen, Ponca City, Okla., to Lubri-Zol Development Corp., Cleveland, Ohio.

Production low boiling hydrocarbon oils. No. 2,074,467. Carlos L. Gutzeit, Ithaca, N. Y., to Standard Oil Development Co., corporation of Del.

Working up gases containing hydrocarbons in electric arcs. No. 2,074,430. Paul Baumann and Heinrich Schilling, Ludwigshafen-am-Rhine, and Robert Stadler, Ziegelhausen, Germany, to I. G., Frankfort-am-Main, Germany.

Apparatus for conversion hydrocarbon oils. No. 2,074,539. Louis de Florez, Pomfret, Conn., to Texas Co., New York City.

Apparatus for producing wells. No. 2,074,608. James E. Gosline, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco, Cal.

Process extracting and recovering volatile hydrocarbons from gases. No. 2,074,644. Harry E. Drennan, Whittenburg, Tex., to Phillips Petroleum Co., corporation of Del.

Production bituminous emulsion of the oil-in-water type. No. 2,074,731. Claude L. McKesson to American Bitumuls Co., both of San Francisco, Cal.

Apparatus for dispensing liquid fuels, lubricating oils, etc. No. 2,074.927. Abraham Isaac Logette and Edgar Harry Dainton, London, England.

Lubricating device. No. 2,074,943. Campbell K. Sharp, Jackson, Tenn., to Sharvania Oil & Grease Corp., Memphis, Tenn.

Recovery and stabilization of gasoline. No. 2,074,978. David G. Brandt, Westfield, N. J., to Doherty Research Co., New York City.

Treatment heavy oil with alkali metal to form wax. No. 2,075,151. Justin F. Wait, New York City.

Method and apparatus for converting hydrocarbons. No. 2,075,164. John C. Black, Los Angeles, Cal., to Gasoline Products Co., Inc., Wilmington, Del.

Process for desulfurizing hydrocarbons. Nos. 2-075,171-2-3-4. Albert E. Buell and Walter A. Schulze to Phillips Petroleum Co., all of Bartlesville, Okla.

Hydration of olefines. Nos. 2,075,203-4. Walter Philip Joshua, Cheam, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Sutton, England.

Solvent refining of lubricating oil. No. 2,075,268. Louis A. Clarke, Fishkill, N. Y., to Texas Co., New York City.

Solvent refining of lubricating oil. No. 2,075,269. Louis A. Clarke, Fishkill, and Chas. C. Towne, Beacon, N. Y., to Texas Co., New York City.

Production an impregnated dielectric material, using a highly viscous hydrocarbon in process. No. 2,075,410. Archibald Walter Thompson, Bromley, England.

Conversion and coking of hydrocarbon oils. No. 2,075,599. Jos. G. Alther to Universal Oil Products Co., both of Chicago, Ill.

Apparatus for subjecting hydrocarbon oils to conversion temperatures. No. 2,075,601. Marion W. Barnes to Universal Oil Products Co., both of Chicago, Ill.

Cyclic process of producing amines of saturated hydrocarbons. No. 2,075,825. Morris S. Nafash, Union City, N. J., to Cesare Barbieri, New York City.

Method treating tar-acid- and neutral-oil-containing liquid hydrocarbon material. No. 2,075,866. Arthur H. Radasch, Bloomfield, and Wilfred M. Bywater, Weehawken, N. J., to Barrett Co., New York City.

Treatment petroleum products for removal of distillate odors and tastes. No. 2,075,871. Frank L. Smith, Olean, N. Y., to Socony-Vacuum Oil Co., New York City.

Manufacture aliphatic anhydrides. No. 2,075,889. Henry Dreyfus, London, England.

Conversion hydrocarbon oils. No. 2,075,896. Wayne A. S. Harmon, Los Angeles, Cal.

Treatment hydrocarbon oil. No. 2,075,901. Stephen S. Johnson, Jr., Short Hills, N. J., to Gasoline Products, Inc., Newark, N. J.

Combined stabilizing and gas conversion process. No. 2,076,013. Malcolm P. Youker to Phillips Petroleum Co., both of Bartlesville, Okla.

Refining petroleum oil by treatment with a mixture of acetone and triethanolamine as a selective solvent. No. 2,076,105. Wm. Hunter Volck, Watsonville, Cal., to California Spray Chemical Corp., Berkeley, Cal.

Apparatus for propane dewaxing. No. 2,076,141. Henry O. Forrest, Teaneck, N. J., to Standard Oil Co., Chicago, Ill.

Production dewaxed mineral oil. No. 2,076,147. Leo D. Jones to Sharples Specialty Co., both of Phila., Pa.

Preparation a non-water dispersible, wax-containing petroleum lubricating oil containing diethylene-glycol, castor oil fatty acids, and an aluminum soap. No. 2,076,153. Francis J. Licata, New York City, to National Oil Products Co., Harrison, N. J.

Apparatus for wax crystallization. No. 2,076,161. Jack Robinson, East Alton, Ill., and Vanderveer Voorhees, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Refining hydrocarbon oils; subjecting same while in heated vaporous condition to action of a double salt of aluminum chloride and a chloride of another metal in molecularly equivalent proportions. No. 2,076,201. Siegfried Leonard Langedijk and Adrianus Johannes van Peski, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Apparatus for well surveying. No. 2,076,211. Alphons Gerard Hubert

Straatman, The Hague, Netherlands, to Shell Development Co., San Francisco, Cal.

Dehazing furnace oil by treatment with an aqueous solution of alkali. No. 2,076,392. Richard Z. Williams, Destrehan, La., to Pan American Petroleum Corp., New York City.

Treatment hydrocarbon oils. No. 2,076,394. Geo. Armistead, Jr., Port Arthur, Tex., to Texas Co., New York City.

Treating solid lump fuel with heavy hydrocarbon oil of a viscosity too high to be sprayed in a fine mist at ordinary temperatures. No. 2,076,497. Carleton Ellis, Montclair, N. J., to Standard Oil Development Co., corporation of Del.

Method restoring deteriorated cracked gasoline containing organic peroxides formed during deterioration and for stabilizing the gasoline against further deterioration. No. 2,076,524. Fred B. Behrens to Universal Oil Products Co., both of Chicago, Ill.

Separation of hydrocarbons. No. 2,076,557. Crawford H. Greenewalt to du Pont, both of Wilmington, Del.

Method refining gasoline containing mono-olefines and constituents more easily polymerizable. No. 2,076,681. Morris S. Kharasch, Chicago, Ill., to du Pont, Wilmington, Del.

Process for breaking petroleum emulsions. No. 2,076,623. Melvin De Groote, University City, Bernhard Keiser, Webster Groves, Leonard L. Faure, Kirkwood, and Arthur F. Wirtel, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Process for breaking petroleum emulsions. No. 2,076,624. Melvin De Groote, St. Louis, Mo., to Tretolite Co., Webster Groves, Mo.

Conversion of higher boiling hydrocarbon oils into lower boiling ones. No. 2,076,695. John C. Black, Beverly Hills, Cal., to Gasoline Products Co., Inc., Newark, N. J.

Production asphalt from semi-paraffinic type petroleum oils. No. 2,076,-799. Robt. R. Thurston, Beacon, N. Y., to Texas Co., New York City.

Process for removing carbonaceous deposits from fluid conduit of an oil heater. No. 2,076,847. Chas. L. Johnston, Long Beach, Cal., to Universal Oil Products Co., Chicago, Ill.

Furnace and method of heating hydrocarbon oils to conversion temperature. No. 2,076,856. Wm. H. Minkema to Universal Oil Products Co., both of Chicago, Ill.

Recovery of olefines from gaseous or liquid mixtures. No. 2,077,041. Harold S. Davis and Alfred W. Francis, Woodbury, N. J., to Socony-Vacuum Oil Co., Inc., New York City.

Manufacture ethers; chemically reacting a secondary base olefin with an alcohol of an order not above secondary. No. 2,077,042. Alfred W. Francis, Woodbury, N. J., to Socony-Vacuum Oil Co., Inc., New York City.

Apparatus for solvent refinement of hydrocarbons. No. 2,077,057. John W. Poole, Jaffrey, N. H.

Process for breaking petroleum emulsions. No. 2,077,229. Melvin De Groote, St. Louis, and Arthur F. Wirtel, Kirkwood, Mo., to Tretolite Co., Webster Groves, Mo.

Process for breaking petroleum emulsions. No. 2,077,230. Melvin De Groote, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Process for extracting a mineral oil by means of counterflowing separable, paraffinic, and naphthenic solvents. No. 2,077,287. Malcolm H. Tuttle, New Rochelle, N. Y., to Max B. Miller & Co., Inc., New York City.

Recovery hydrocarbons. No. 2,077,344. Jos. K. Roberts, Hammond, Ind., and Percy C. Keith, Jr., Bernardsville, N. J., one-half to M. W. Kellogg Co., New York City, and one-half to Standard Oil Co., Chicago, Ill.

Resins, Plastics, etc.

Solvent and plasticizing composition. No. 2,073,938. Lucas P. Kyrides, Webster Groves, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Manufacture flexible bands, tubes, and threads of polystyrol and other polymerization products of aryl olefines. No. 2,074,285. Ernst Studt, Nordenham, and Ulfilas Meyer, Cologne-Mulheim, Germany, to Norddeutsche Seekabelwerke A. G., Nordenham, Germany.

Manufacture artificial resins; using phthalic anhydride, glycerin, and castor oil. No. 2,074,509. Herbert Honel, Vienna, Austria, to Beck, Koller & Co., Detroit, Mich.

Manufacture foils and artificial molded products. No. 2,074,647. Max Hagedorn and Armin Ossenbrunner, Dessau in Anhalt, Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Manufacture compatible and homogeneous resinous compounds; heating fatty oil modified polyhydric alcohol-polybasic acid resin with an organic peroxide and combining with the peroxide treated resin a urea-aldehyde condensation product. No. 2,074,782. Donald Edwards Edgar, Philadelphia, Pa., to du Pont, Wilmington, Del.

Production synthetic resin; the resinous reaction product of an aldehyde and a polynuclear polyketone in which the carbon atom of each ketone group is a part of a hydroaromatic ring and is attached to at least one methylene group. No. 2,074,786. Geo. De Witt Graves to du Pont, both of Wilmington, Del.

Production resinous compositions; combining a polyhydric alcohol-polybasic acid resin with urea-aldehyde hydroxylated fatty oil acid. No. 2,074,814. Wilfred Winter Smith, Kenmore, N. Y., to du Pont, Wilmington, Del.

Preparation tertiary alkylaryloxy alkylols. No. 2,075,018. Herman A. Bruson, Elkins Park, and Otto Stein, Lansdowne, Pa., to Rohm & Haas, Phila., Pa.

Preparation a thermoplastic comprising blended mixture of polymerized vinyl acetate and sulfur. No. 2,075,045. Geo. Jas. Manson, Hawkesbury, Ont., Canada.

Preparation urea-aldehyde resin molding composition using also a protein substance. No. 2,075,276. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Production condensation products, comprising an acid amide, formaldehyde, and one of the group of phenols and phenol-carbonyl condensation products. No. 2,075,340. Ludwig Cserny, Wiesbaden, Germany, to Resinous Products & Chemical Co., Phila., Pa.

Manufacture synthetic resins; reacting a polyether resin with an organic compound containing a plurality of halogen atoms attached to different carbon atoms which are in turn attached to an ether oxygen atom. No. 2,075,343. Geo. De Witt Graves to du Pont, both of Wilmington, Del.

Production vinyl resins of high average molecular weight. No. 2,075,-429. Stuart D. Douglas, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Machine for molding plastic substances. No. 2,075,476. Albert Wm. Sizer, Hessle, Kingston-upon-Hull, England.

Stabilization of vinyl resins and compositions produced thereby. No. 2,075,543. Marion C. Reed and Frazier Groff, Lakewood, Ohio, to Union Carbide & Carbon Corp., New York City.

Method polymerizing vinyl compounds. No. 2,075,575. Stuart D. Douglas, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Continuous method of and apparatus for making plastic products. No. 2,075,735. Evarts G. Loomis, Newark, N. J.

Manufacture white synthetic resins containing the reaction products of urea, an acid, and formaldehyde. No. 2,075,804. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Preparation molding urea condensation plastic. No. 2,075,805. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Manufacture polyvinyl derivatives containing nitrogen. Nos. 2,076,130-1. Herbert Rein, Leipzig, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture laminated rolled articles from sheet-like material; using an intermediate layer of a permanently fusible non-hardening amine resin. No. 2,076,456. Alphonse Gams, Karl Frey, and Theodore Sutter to Society of Chemical Industry in Basle, all of Basel, Switzerland.

Preparation a moldable and heat hardenable abrasive mixture, comprising abrasive granules coated with a reactive liquid resin, and a finely divided solid and reactive resin. No. 2,076,517. Norman P. Robie, Washington, D. C., to Carborundum Co., Niagara Falls, N. Y.

Means of and apparatus for testing stability of plastic and semi-plastic materials and mixtures. No. 2,076,592. Edmund O. Rhodes, Pittsburgh, Pa., to Koppers Co., corporation of Del.

Manufacture thermoplastic compositions; dispersing and grinding rubber and a derivative of cellulose in solid form in a liquid medium. No. 2,076,781. Henry Jacobsen (by judicial decree to Henry Jenett), Englewood, N. J., to Celanese Corp. of America, corporation of Del.

Preparation resin soluble in acetone; polymerizing a sugar by heating in presence of an aqueous solution of a mineral acid. No. 2,076,795. Geo. W. Seymour, Cumberland, Md., to Celanese Corp. of America, corporation of Del.

Production modified resin having solubility in alcohol. No. 2,077,009. Jos. Rivkin to Neville Co., both of Pittsburgh, Pa.

Production condensation products of the acridine series. No. 2,077,-064. Friedrich Ebel, Mannheim, and Christian Steigerwald, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York City.

Rubber

Method concentrating latex, by raising temperature above 45°C. and centrifugally separating latex into cream and skim. No. 2,074,494. Douglas Frank Twiss, Wylde Green, Birmingham, and Eric Wm. Bower Owen, Erdington, Birmingham, England, to Dunlop Rubber Co., Ltd., London, England.

Production high tension rubber insulation; using a rubber compound including graphite. No. 2,074,826. Chas. R. Boggs, Waban, Mass., to Simplex Wire & Cable Co., Boston, Mass.

Method preserving rubber. No. 2,074,993. Robt. L. Sibley, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Dispensing device for sheet rubber deposited from an aqueous dispersion of rubber and process of forming and using same. No. 2,075,178. Lloyd G. Copeman to Copeman Labs. Co., both of Flint, Mich.

Treatment stabilized rubber derivatives; fluxing a rubber hydrohalide with elemental sulfur. No. 2,075,251. Herbert A. Winkelmann, Chicago, Ill., to Marbon Corp., corporation of Del.

Preparation modified halogen containing butadiene bodies; milling rubber and polymerized chloroprene and subjecting to a hydrogen halide. No. 2,075,252. Herbert A. Winkelmann, Chicago, Ill., to Marbon Corp., corporation of Del.

Preparation hydrohalogenated vulcanized butadiene bodies; comprising reaction product of a liquefied hydrogen halide and vulcanized rubber, and polymerized chloroprene. No. 2,075,253. Herbert A. Winkelmann and Eugene W. Moffett, Chicago, Ill., to Marbon Corp., corporation of Del.

Preparation vulcanized halogen containing rubber derivatives; reacting a rubber hydrohalide with sulfur under influence of heat. No. 2,075,254. Herbert A. Winkelmann, Chicago, Ill., to Marbon Corp., corporation of Del.

Production shaped articles from synthetic latex. No. 2,076,949. Jas. E. Kirby to du Pont, both of Wilmington, Del.

Production sulfonic acids and salts; interacting rubber with butyl alcohol and sulfuric acid. No. 2,077,133. Robert L. Sibley, Nitro, W. Va., to Monsanto Chemical Co., St. Louis, Mo.

Textile, Rayon

Centrifugal bucket for spinning. No. 2,073,840. Paul E. Harrison, Dennison, Tenn., to du Pont, Wilmington, Del.

Production cellulose acetate products adapted to yield haze-free products; washing cellulose acetate with a wash water having an A. P. H. A. turbidity of below 0.9. No. 2,073,853. Ferdinand Schulze, Waynesboro, Va., to du Pont, Wilmington, Del.

Process sizing rayon spinning cakes in situ without injurious agglutination; wrapping the cake in a permeable cloth, applying a drying oil, and drying without rewinding. No. 2,073,857. Johann Jos. Stoeckly, Teltow Seehof, and Erhard Witte, Berlin-Lichterfelde, Germany, to No. American Rayon Corp., corporation of Del.

Apparatus for manufacture artificial silk. No. 2,073,906. Hans Alwin Schrenk, Arnhem, Netherlands, to American Enka Corp., Enka, N. C.

Removal rubber strands from woolen textiles; using chemical reagent in process. No. 2,073,916. Ivan V. Wilson, Dayton, O., to Merrimac Chemical Co., Everett, Mass.

Apparatus for spinning rayon, etc. No. 2,074,022. Oskar Oppenlaender, Rome, Ga., to Tubize Chatillon Corp., New York City.

Continuous dyeing process for cellulose materials. No. 2,074,031. Jas. H. Stradley, Carneys Point, N. J., to du Pont, Wilmington, Del.

Treatment artificial silk coagulated in an acid bath. No. 2,074,076. Hans Alwin Schrenk, Arnhem, Netherlands, to American Enka Corp., Enka, N. C.

Process for production on cellulosic textiles of white resist styles with such sulfuric esters of leuco vat dyestuffs as have affinity for cellulosic textile material. No. 2,074,197. Alec Wormald, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Process and apparatus for drying artificial silk. No. 2,074,232. Adrian J. L. Moritz to American Enka Corp., both of Enka, N. C.

Apparatus for formation filaments artificial silk, etc. No. 2,074,682. Robert de Stoutz, Zurich, Switzerland.

Apparatus and method for treating yarn; using lubricant in process. No. 2,074,745. Ira L. Griffin, Charlotte, N. C.

Manufacture and treatment artificial silk, etc. No. 2,075,027. Henry Dreyfus, London, England.

Treatment textile fibers; preparing a taffeta containing yarns of organic derivatives of cellulose by treatment in a bath of aqueous alcohol. No. 2,075,143. George Schneider, Montclair, N. J., to Celanese Corp. of America, corporation of Del.

Manufacture or treatment of artificial filaments, etc. No. 2,075,430. Henry Dreyfus, London, England.
Method finishing knit fabrics containing organic derivatives of cellulose, using oil emulsion in process. No. 2,075,887. Camille Dreyfus, New York City.
Manufacture artificial materials by dry spinning process. Nos. 2,075,-888-90. Henry Dreyfus, London, England.
Production artificial thread. No. 2,076,801. Gilbert I. Thurmond, Asheville, N. C., to American Enka Corp., Enka, N. C.
Method spinning and winding artificial silk filaments. No. 2,076,802. Hendrik Gerardus van der Waals, Arnhem, Netherlands, to American Enka Corp., corporation of Del.
Formation cellulose products, first treating cellulose fibre containing mass with dilute nitric acid. No. 2,076,817. Adam Hoche, Brooklyn, N. Y., to Cellulose Research, Inc., Chicago, Ill.
Manufacture staple fiber yarns from continuous filaments. Nos. 2,077,-078-9. Wm. Ivan Taylor, Frank Corbyn Hale, and Alfred Herbert Woodruff, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.
Process for obtaining an artificial thread of a fluffy character. No. 2,077,087. Jean Marie Albert, Lyon, France, to du Pont, Wilmington, Del.
Method and apparatus for spinning rayon. No. 2,077,141. Jean Bruggeman, Alost, Belgium, to Skenandoa Rayon Corp., Utica, N. Y.
Manufacture staple fiber yarns from continuous filaments. No. 2,077,-283. Wm. Ivan Taylor and Leslie Brisbane Gibbins, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.
Manufacture staple fiber yarns from continuous filaments. No. 2,077,-320. Frank Corbyn Hale and Wm. Howarth, Spondon, near Derby, England, to Celanese Corp. of America, corporation of Del.
Nozzle for electrical spinning of artificial fibers. No. 2,077,373. Anton Formhals, forty-five one-hundredths to Richard Schreiber-Gastell, both of Mainz, Germany.

Water

Sewage treating process. No. 2,074,082. Bernhard P. Domogalla, Madison, Wis.
Filter bed cleaning device for sewage clarification tanks. No. 2,074,-965. Wm. C. Laughlin, Kew Gardens, N. Y., and Abraham B. Asch, Jersey City, N. J., to Filtration Equipment Corp., New York City.
Filtration of sewage, etc. No. 2,075,542. Francis L. Pruyn, Sea Girt, N. J., to Underpinning and Foundation Co., Inc., New York City.
Sewage treatment apparatus. No. 2,076,529. Augustus C. Durdin, III, Niles Center, Ill., to Chicago Pump Co., Chicago, Ill.
Process and apparatus for water purification. No. 2,076,964. Richard Pomeroy, Harbor City, Cal., one-half to Arthur P. Banta, Pasadena, Cal.
Water softening apparatus. No. 2,077,003. John H. Nash, Dayton, O.
Process purifying chlorine. No. 2,077,310. Russell E. Cushing, Wyandotte, Mich., to Penn. Salt Mfg. Co., Phila, Pa.

Industry's Bookshelf

A Text-Book of Physical Chemistry by Sylvanus J. Smith, MacMillan and Co. Ltd., London, England, 354 pp. $2.00.

A condensed concentrated working text with constant references to practical problems and their work-a-day applications in the chemical industry.

The Technology of Plastics by H. W. Rowell, The Plastics Press, London, Chemical Publishing Co., 148 Lafayette st., N. Y. City, U. S. Agent, 206 pp., $4.00.

Introduction to the chemistry and art of modern plastic materials—clear and simple handling of a complicated subject.

Chemical Procedures for Clinical Laboratories by Marjorie R. Mattice, Lea & Febiger, Philadelphia, Pa., 520 pp., $6.50.

Following the practical basis of actual laboratory practice, this book presents biological data and chemical methods completely, exactly and logically.

Properties of Metals and Alloys by N. F. Mott and H. Jones, Oxford University Press, 114 5th ave., N. Y. City, 326 pp., $8.00.

Relation of crystal structure, magnetic susceptibility and electrical optical properties, to each other and to their chemical properties, interpreted in the modern light of the electron theory.

Household Pests by Peter B. Collins, Pitman Publishing Co., 2 West 45th Street, N. Y., 98 pp., $1.00.

A handbook for the layman but very useful in its short good descriptions of pests and their habits.

Pyrethrum Flowers by C. B. Gnadinger, McLaughlin, Gormley King Co., Minneapolis, Minn., 380 pp., $5.00.

The "last word" brought up to date in a 2nd edition with a supplement by one of the world's first authorities. It covers the subject from cultivation of the plants to latest tests of toxicity.

Prelude to Chemistry by John Read, MacMillan Co., 60 Fifth Ave., N. Y., 328 pp., $5.00.

A sumptuous book in word, type, and illustration—enthusiastically written story of alchemy, its literature, its symbols and its art.

Commerce and Society by W. F. Oakeshott, Oxford Univ. Press, Inc., 114 Fifth Ave., N. Y., 418 pp., 7s. 6d.

More commerce than society, but sound, crisply written, descriptive account of trade and finance from old Egypt to now—entertaining, useful introduction.

The Recovery Problem in the United States, Brookings Institution, Washington, D. C., 709 pp., $4.00.

Detailed factual study of the state of business that points out our extreme dependence for good or ill upon government action—"we are gambling upon a sufficiently rapid growth in national income to permit a balancing of the budget before confidence in the government wanes."

Text Book of Paper-Making by C. F. Cross and E. J. Bevan, E. & F. Spon, Ltd., London, England, U. S. agents, Chemical Publishing Co., N. Y. City., 527 pp., $6.00.

New Fifth Edition with current additional matter by J. F. Briggs, bringing this "paper-making bible" thoroughly up to date.

Practical Course in Agricultural Chemistry by Frank Knowles and J. Elphin Watkins, MacMillan, N. Y. City, 188 pp., $3.60.

Highly condensed and practical treatment of the chemistry of soils, fertilizers, feedstuffs, insecticides, etc.

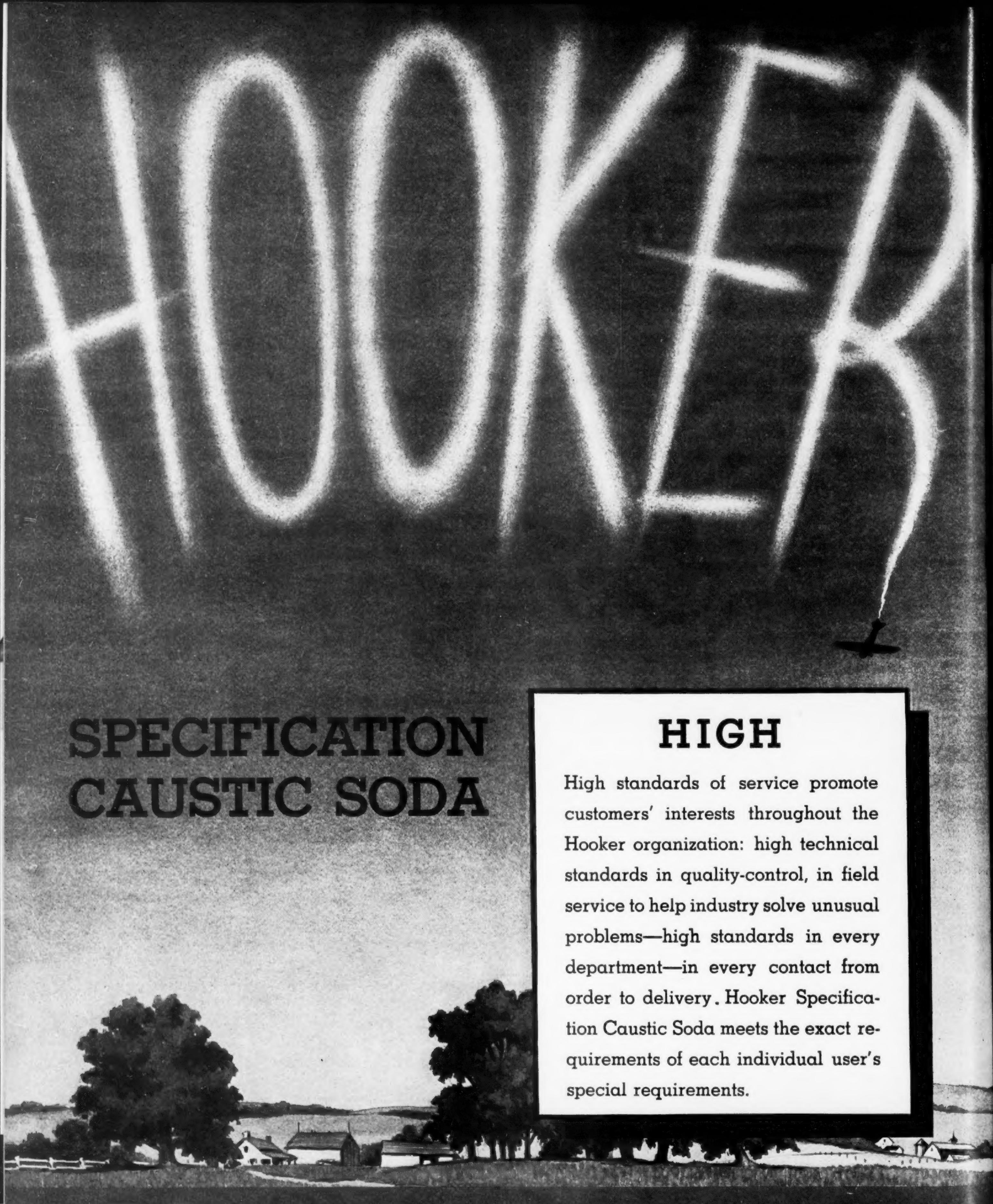
The Technique of Marketing Research, McGraw Hill, N. Y. City, 341 pp., $4.00.

The technique of planning, collecting, collating, preventing and analyzing the facts and figures of marketing research, prepared by the Committee on Marketing Research Technique of the American Marketing Society.

Aluminum Paint and Powder by Junius David Edwards, Reinhold Publishing Co., N. Y. City, 216 pp., $4.50.

A new edition incorporating the results of the rapid development of the use of metallic paints written by the Assistant Director of Research of the Aluminum Co. of America.

Making and Moulding of Plastics reviewed in this column March, 1937, is for sale in this country by the Chemical Publishing Company, 148 Lafayette Street, New York, N. Y.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- Association News

Popular experiment with du Pont's new flame-retardant agent – see news item.

The author with some of his star students at the special exterminators course held at Purdue last winter. Left to right, Wm. O. Buettner, E. H. Arnott, Virgil Laird, J. J. Davis, B. W. Eldridge.

Scientific Help for the Practical Exterminator

By J. J. Davis

Prof. Entomology, Purdue University

FOR 50 years or more commercial pest exterminators have operated in the larger cities with good to indifferent success. The pioneers in this work were conscientious operators. Economic entomology as a science was itself just beginning to find its place at that time, and the trained entomologist gave little thought to the commercial exterminator. The numbers of exterminators increased, with an increasing number of untrained men attempting the work. Such conditions favored what has been called a "racket," and with the marked interest aroused in termite control during the past decade this racket has become more evident.

Until very recent years entomologists have had little contact with exterminators and have not attempted to co-operate with or aid them. Similarly the exterminators have not attempted to contact or secure aid from the entomologists. An occasional entomologist, as George Sanders, George Hockenyos and Charles Denny, entered the commercial field. The value of their training was at once evident.

Again, only a few years ago, the National Association of Exterminators and Fumigators was organized under competent and foresighted leadership for better service, better training, and the elimination of the incompetent operator. Entomologists may have given a little cooperation, but it was essentially this group of exterminators themselves that recognized the faults of the industry and the need of changes to give pest control a professional standing.

A year ago in November I was a visitor at the annual meeting of this Association. I met an intelligent group of men, evidently interested in improving their profession, although I gleaned an impression that some were of the opinion that the entomologist might be attempting to dictate to them. The following year I was invited to speak before that Association and I took as my topic, "The Goal of the Pest Control Operator." In concluding my remarks, I urged cooperation between exterminators and entomologists which could best be inaugurated by a committee of the exterminators meeting with a similar committee of the entomologists. This has been done, and with Prof. W. P. Flint, chairman of the entomologists, the first joint meeting was held last December. A standing committee of the economic entomologists has been approved, to co-operate with the exterminators.

Far-reaching activities may be anticipated. Incidentally, I also spoke of our intention to hold a short course or conference for Indiana pest control operators. This idea was apparently in line with the thoughts of the exterminators for they had already inaugurated a series of clinics dealing with the several household pests. At the suggestion of the National Association of Exterminators and Fumigators we gladly opened the Indiana conference to all exterminators. We planned on a five-day conference in January of 1937. We expected 30 or 35 to attend. To our amazement 81 from 14 states registered. Furthermore, all three past presidents of the National Association of Exterminators and Fumigators, and the present president, attended.

We had no precedent for our program. From suggestions from exterminators and from our own observations as to needs, we outlined a program. We gave considerable time to the fundamentals of insect life, insect identification and insect control. This was followed by several half-day clinics on several major household pests. Apparently we succeeded in providing in this initial conference the topics desired. I was especially surprised at the intense interest in the half-day spent in the laboratory on insect identification, and the realization by those present of the importance of being able to recognize not only the common household pests, but other insects in or about the home regardless of their economic importance.

This pioneering conference has demonstrated the need and value of such conferences; that exterminators appreciate the information available through entomologists; the value of close and cordial association and cooperation with fellow workers; an interest has been aroused which will serve as an incentive for further knowledge of insects; entomologists have been aroused to a realization that more research on household insects is urgently needed.

Finally, word regarding the outlook for trained entomologists in the field of pest extermination. Many commercial concerns are asking for trained entomologists. They appreciate the need of trained men and the prestige of having such men on their staff. However, entomologists should themselves appreciate the need of practical experience and even though they have technical entomological training, they can scarcely expect to embark in the business of pest control without the training which only practical experience will give. The opportunities for expanding the field of pest control are great, the field is wide open for the entomologist, and there is ample room for all who are properly qualified.

Laundry Chemicals

Bleaches, Bluing and Sours Described

By Benjamin Levitt

IN 1935, 30,865 persons were employed (full and part time) in 16,765 hand laundries according to the preliminary report of the U. S. Census and 6318 power laundries employed 203,582 wage earners, exclusive of salaried officers and employees.

Hand laundries sales were $41,680,000, while the receipts of power laundries were $361,602,316. In other words, at least 250,000 persons are gainfully employed in this industry, which produces work costing the public over a third billion dollars annually.

Although the Census Bureau does not detail the costs of production, obviously considerable money is spent for soap and chemicals.

After several washes with soap and alkalies, the clothes are subjected to a chlorine bleach, by the addition of a dilute solution of sodium hypochlorite in the washing machine.

While many laundries buy bleach already prepared for use, some larger ones, as well as textile plants prepare it themselves, either by reacting calcium hypochlorite with soda ash, or by the addition of chlorine to a solution of caustic soda or soda ash.

For the convenience of small users, calcium hypochlorite is now prepared in small packages containing as high as 70 per cent. available chlorine.

The most economical method is to make it from caustic soda and chlorine, in accordance with the following reaction: $2\ NaOH + Cl_2 = NaOCl + NaCl + H_2O$. Dissolve 125 pounds of caustic soda in 400 gallons of water, in a steel tank and allow to cool. The solution is then transferred to a tank below, constructed of stone or concrete lined. A cylinder containing 100 pounds of liquid chlorine, standing on a scale, is then connected to a perforated lead coil which extends along the bottom of the reacting tank. The chlorine is passed slowly into the lye, so that no appreciable amount of heat is generated. The solution is ready when all the chlorine has passed in. This yields a 3 per cent. available chlorine solution. Stronger or weaker solutions may be made as desired.

The mechanism by which chlorine bleaches, may be described as follows: Sodium hypochlorite being an unstable chemical, when introduced into a hot solution quickly decomposes to liberate nascent oxygen and sodium chloride. The active oxygen bleaches and disinfects.

The specifications cited below will serve as examples upon which federal, state, municipal governments as well as other large buyers, base their purchases of laundry chemicals.

Commonwealth of Pennsylvania Specification No. B-89: Liquid Laundry Bleach

	Min.	Max.
Available Chlorine by weight	15%	
" " " volume	19	
Sodium Hydroxide as NaOH	0.25	1.0%
Total Alkali as Na_2O		1.4
Specific Gravity at 60° F. shall be from 1.24 to 1.30		

Laundry bluing is used either alone or in combination with acids or other chemicals as indicated opposite, to correct the yellowish tint which may remain on the clothes after washing.

Penna Spec. B. 91: Liquid Laundry Bluing

This is to be used for either sour or non sour tinting (bluing) in laundry practice.

General requirements: The material shall be a liquid bluing of uniform quality, which when mixed in the proportion of two fluid ounces (containing the equivalent of 1 oz. of the dry blue) to two to three gallons of water will yield a stock solution which will, when used in the proper dilution under correct conditions, tint clothes to a bright white. The color shall be fugitive to washing.

Detailed requirements:

	Min. %	Max. %
Sod. or Pot. Ferricyanide	none	
Direct cotton dyes	"	
Napthol blue black	"	
Water insoluble (1% solution in distilled water)		0.1
Aniline blue and standardizing salts such as sodium chloride, sodium sulfate		remainder

Color of solution when mixed with water shall be reddish blue. The bluing shall be suitable for use over a pH range of 4 to 7.2. In sour bluing procedure, the use of acetic acid in conjunction with liquid bluing is permissible only in strengths and amounts recommended by the vendor. Where powdered bluing is required, it generally conforms to the same specifications as to absence of sod. and pot. ferricyanides, direct cotton dyes, napthol blue black or water insoluble matter.

Laundry sours are used to neutralize any alkali which may remain in the fabrics after washing. Ammonium silico fluoride 98 per cent. is used for neutralizing only. Ammonium bi-fluoride (93 per cent. minimum for use with iron bearing water supplies) is used alone or in conjunction with ammonium silico fluoride as a neutral sour and as an aid in prevention of discoloration caused by iron-bearing water. This material being more soluble than sodium bifluoride is suitable for souring to a pH as low as 4.2.

1. Sodium bifluoride	25%	2.	50%
" silico fluoride	75		50
3. Ammon. bifluoride	25	4.	50%
" silicofluoride	75		50

Another authority recommends the following type of laundry sour because it removes iron stains, by virtue of the formation of complex iron oxalate anions. Three pounds of oxalic acid dissolved in three gallons of hot water, and when cool, 8½ pounds of acetic acid (56 per cent.) added. One pint of this sour is used per 200 pounds of goods.

Graphite Paint Formulas

Best results are to be obtained, if the graphite utilized be finely divided and its pure carbon content not less than 70 per cent. Amorphous graphites are unsuitable, as their carbon content may be low. The presence of clay or hydrated aluminum silicates containing water of crystallization is not of advantage in an anti-corrosive paint. Graphites of inferior quality are apt to contain sulfur, a particularly prejudicial constituent.

Graphite paints can be made with either boiled or raw linseed oil, a mixture being perhaps best practice. Manganese dioxide or litharge can be used as drying agents in the production of boiled oils, but when the graphite paints are to withstand rather high temperatures, an oil boiled with manganese is the better. The simplest type of graphite paint can be made up on the basis of about 75 per cent. by weight of graphite and 25 per cent. by weight of linseed oil.

The color can be lightened by other pigments such as zinc oxide or titanium oxide, while cost may be reduced by the inclusion of barium sulfate. An average grade paint may be made up on the basis of 40 parts by weight graphite, 40 parts zinc oxide, and 40 parts linseed oil, or 20 parts of barium sulfate, may be used in substitution of an equal weight of zinc oxide. *Chemical Trade Journal*, (London).

New Ideas in the Specialties Field

Polishing Cements

Many think that the base of polishing cement is sodium silicate. While it is a necessary ingredient as a flowing and drying agent, the real base of polishing cement lies in the dry bond ingredient.

Being made wholly of mineral substances, polishing cement can be definitely controlled as to grading, none of the elements involved having variable qualities. Accordingly, it is furnished in one grade, being prepared for immediate use and having a liquid bond that can be used to regulate the density to conform with the sizes of abrasives and work to be polished.

As cement sets instead of sticks, the object covered becomes an integral part of the cement, and the strength of the binder is dependent upon the strength of the fabric or base to which it is applied. Regardless of the density at which the cement is applied, the tensile strength of the layer itself does not vary.

Polishing cement is easy to clean from wheels or belts with stone or pumice or with hot water. No labor is needed for preliminary preparation or for cleaning the utensils after each day's work. Since it will not spoil there is no loss when there is a quantity left over in the pail, and it is usable without loss of efficiency the following day or at any time it is needed again.

Viscosity of polishing cement increases with age. It can be thinned to proper consistency with a thinner which increases the volume and wetting or spreading properties plus increase in grain absorption.

New Textile Oils

While olive oil has long been the most generally used oil for wool-combing, it has definite drawbacks and recent world shortage has pointed interest towards synthetic and processed oils.

The drying and semi-drying oils are totally unsuitable for this use, and of the non-drying group, some, such as neatsfoot and almond, are ruled out by price and supply, while others such as cottonseed are solid fats.

Arachis oil was used during the war period, and provided the oil wool be processed and scoured within a few weeks, ordinary arachis is a fairly safe oil. Even under these conditions for no known reason, oxidation faults often developed, while oiled tops stored for twelve months or so invariably suffered serious oxidation.

Teaseed oil is chemically indistinguishable from olive oil, and no reason is deduced why it should not be as suitable. Plant experience, however, proves conclusively that the use of teaseed is attended with serious risk. It must also be remembered that the total world production is not very large.

Sperm oil, also, is to be classed as dangerous because of oxidation. It has further disadvantages in that its viscosity is much lower than olive, that it has a characteristic fishy smell, and that it solidifies in cold weather sooner than olive.

Castor oil tested for oxidation in the Mackey apparatus is no better than olive oil. Although it does not "dry" to a solid film like the unsaturated bodies in arachis, it nevertheless is much thickened by air oxidation, and tends to become gummy and sticky. These qualities do not commend it for textile use.

For textile purposes only an exceptionally well refined mineral oil of water-white color and approaching medicinal quality can be considered with safety. Given such an oil which, so far as lubrication during combing and spinning is concerned, is entirely suitable, the question of scouring must be considered. Mineral oils are very difficult to scour out, and although Speakman and others have attempted to overcome this disability with considerable success, it cannot be said that even the treated oils are proof against scouring trouble.

In order to minimize for commercial purposes the oxidation of olive oil, it is therefore necessary, first, to devise a simple and inexpensive method of removing oxidizing catalysts, and subsequently to find some means of ensuring that the activity of iron salts picked up by the processed oil will be nullified. Success has been attained with olive oil treated according to the Nilox process. After processing oil has an almost perfect Mackey test which is scarcely affected by the addition of 0.01 per cent. ferric oleate. This patented process can be applied to most vegetable oils, and in particular has been used with arachis oil. The processed arachis oil is as stable to oxidation in the Mackey test as processed olive oil, and more stable than the majority of commercial olive oils.

Attempts have also been made to synthesize an oil from raw materials which were free from such easily oxidized bodies. Such a synthetic oil must be liquid at ordinary temperatures, have a good cold test, a safe flash-point, no appreciable smell, pale color, low iodine value, good scouring and emulsifying properties, little tendency to oxidation and rancidity, insensitivity to iron salts, and a good Mackey test. It must, moreover, be made from cheap raw materials available in quantity. Eventually an ester was found which satisfied all the above conditions. The indications given by its low iodine value and excellent Mackey test that the ester oil will not oxidize when used as a combing oil have been fully borne out by practical experience.—W. Garner in *Jl. Tex. Inst.*, Mar., '37.

Rotenone Dust Kills Flea Beetles

Flea beetles attacking tobacco plant beds in eastern North Carolina can be controlled effectively with applications of cube or derris dust containing one per cent. rotenone. The dust will eradicate beetles, but is not harmful to the tender young plants, said Dr. B. B. Fulton, entomologist at State College.

With a dusting machine the dust should be blown through the canvas covers over the beds at the rate of ½ lb. to each 100 sq. yds. of bed. Although dust containing one per cent. rotenone is recommended, the weaker dust used to control bean beetles can also be used on flea beetles.

Bean beetle dust contains ¾ of one per cent. rotenone, and when applied to tobacco beds ⅔ of a lb. should be dusted on each 100 sq. yds. of bed.

Both the cube and the derris plants contain rotenone. When ground to dust, the material is diluted with powdered clay to lower the percentage of rotenone so the dust will not be too strong.

After the tobacco plants are set out in the field, they should be dusted the following day, and every fourth day thereafter during favorable weather until the beetles are eradicated. If the plants are rained upon the same day they are dusted, the application should be repeated. When rotenone dust cannot be obtained, the beds may be treated with a dust consisting of one lb. Paris green to five lbs. lead arsenate, but this dust is dangerous to the plants and should be applied carefully and uniformly when the plants are dry.

Paraffin Treating Labels

To treat labels so that the reading will remain legible through use and storage, paraffin is satisfactory but has the disadvantage of having to be melted each time it is used, or being messy to put on, and of being difficult to spread evenly. A solution of 10 grams of paraffin in 100 cc. of gasoline is very satisfactory. A convenient sized bottle carrying a small brush fastened to the stopper has proven very useful in treating the labels. Benzine can be used instead of the gasoline if preferred.—Analyst.

Chemical Specialties

Manufacture printing rolls; using an alkyd resin in process. No. 2,073,528. Moyer M. Safford to General Electric Co., both of Schenectady, N. Y.

Adhesive supply and spreading attachment for fabric coating machines. No. 2,073,557. Harry K. Lea, to Kenlea Mfg. Corp., both of Johnstown, N. Y.

Production colored granular slate, using a metal salt and a soluble silicate in process. No. 20,295. Reissue. Harry C. Fisher, Cincinnati, O., to Minnesota Mining & Mfg. Co., St. Paul, Minn.

Translucent liquid waterproofing composition; consisting of hydrogenated fish oil, rubber, and light hydrocarbon solvents. No. 2,073,630. John Herman Gardthausen, Long Island City, N. Y., to Drigard Products Corp., corporation of Del.

Impregnating composition; comprising reaction product of a solution of ammonium sulfate, ammonium phosphate, boric acid, colemanite, sodium fluoride, carbolic acid, mercuric chloride, zinc chloride, barium hydroxide, aluminum ammonium sulfate, tin chloride, and copper sodium alginate. No. 2,073,634. Olaus T. Hodnefield and Warren W. Shartel, Los Angeles, Cal., said Hodnefield assignor to Shartel.

Gasket for sealing containers consisting of rubber, stearic acid, ceresin, a filler, and a vulcanizing agent. No. 2,073,648. Cecil J. Parker to Crown Cork & Seal Co., Inc., both of Baltimore, Md.

Tarnish and waterproof fabric; using a chemical solution in process. No. 2,073,730. Arthur D. Champlin, Providence, R. I.

Coating composition for labels, etc., consisting of a lacquer containing low viscosity cellulose nitrate and a blown semi-drying vegetable oil. No. 2,073,796. Chas. B. Hemming, Parlin, N. J., to du Pont, Wilmington, Del.

Method of producing a dry basic carbonate white lead powdered pigment having a reduced oil absorption capacity and a reduced bodying action. No. 2,073,817. Edw. D. Turnbull, Scranton, Pa., to Glidden Co., Cleveland, O.

Rug cleaning composition; consisting of wheat flour, magnesium chloride 36° Be., and a cellulose material. No. 2,073,831. Norman L. Cohen and Columbus W. Vincent, both of Los Angeles, Cal.

Preparation bituminous concrete paving material. No. 2,073,907. Richard J. Scullin, Newton, Mass.

Stabilization of soap against rancidity and discoloration induced by copper and iron cations. No. 2,073,923. Ernest C. Crocker, Belmont, Mass., and Lloyd F. Henderson, Reading, Mass., to Arthur D. Little, Inc., Cambridge, Mass.

Adhesive composition comprising an aqueous dispersion of rubber, glycerine, casein, and water. No. 2,073,927. Arthur D. Fuller to National Adhesives Corp., both of New York City.

Production bituminous pavements of high structural strength. No. 2,074,010. Chas. M. Baskin, Montreal, Que., Canada, to Standard Oil Development Co., corporation of Del.

Manufacture packing material adapted for sealing associated parts against leakage when exposed to oxygen, etc., under high pressure; comprising a structure of oil-free leather impregnated with mixture containing a high m ng point wax and a plasticizer. No. 2,074,015. Leo J. Clapsadle, Buffalo, N. Y., to Union Carbide & Carbon Corp., New York City.

Process and apparatus for surfacing roofing. No. 2,074,130. Benj. S. Penley, Yeadon, Pa., to Barrett Co., New York City.

Process and apparatus for surfacing roofing. No. 2,074,131. Benj. S. Penley, Yeadon, Pa., and Richard A. Holdsworth, Bayside, N. Y., to Barrett Co., New York City.

Process and apparatus for surfacing roofing. No. 2,074,147. Richard A. Holdsworth, Bayside, N. Y., to Barrett Co., New York City.

Preparation fungicidal composition obtained by mixing a major portion of wettable sulfur, and a minor portion of lime-sulfur solution. No. 2,074,169. Wm. McIlvaine Dickson, Woodside, Del., to General Chemical Co., New York City.

Preparation insecticidal spray composition, comprising pyrethrins dissolved in a solvent from the class of glycols and glycol ethers. No. 2,074,188. Jean Ripert, to Le Fly Tox, both of Paris, France.

Preparation prepared chemicals; a package of hypo fixing material, comprising a molded solid mass of partly anhydrous and partly crystalline hypo. No. 2,074,200. Walther Barth, Binghamton, and John Forrest, Windsor, N. Y., to Agfa Ansco Corp., Binghamton, N. Y.

Transparent flexible film for wrapping packages, etc.; comprising a fixed prolamin and dibutyl phthalate as plasticizer, and a transparentizing quantity of triethanolamine. No. 2,074,332. Donald W. Hansen, Decatur, Ill., to Prolamine Products, Inc., Dover, Del.

Preparation anti-foaming agents; inhibiting the foaming of an aqueous liquid by incorporating therein a liquid amine insoluble in water. No. 2,074,380. Lawrence H. Flett, Hamburg, N. Y., to National Aniline & Chemical Co., Inc., New York City.

Apparatus for surfacing roofing. No. 2,074,445. Jules L. Wettlaufer, Belmont, Mass., to Patent & Licensing Corp., Boston, Mass.

Production precast fireproofing slab of set cementitious material. No. 2,074,463. Clarke F. Davis, Short Hills, N. J., to American Cyanamid & Chemical Corp., New York City.

Dry cleaning apparatus. No. 2,074,508. Russell A. Hetzer, Cincinnati, O., to American Laundry Machinery Co., Norwood, O.

Liquid soap dispenser. No. 2,074,554. Wm. P. Myron, San Francisco, Cal.

Preparation textile fiber spraying oil, consisting of a light lubricating oil and a small proportion of the acetyl ricinoleic acid ester of an aliphatic alcohol containing from 1 to 5 carbon atoms. No. 2,074,555. Roy F. Nelson, Nederland, Tex., to Texas Co., New York City.

Flooring composition comprising a powdered setting agent, emulsified bituminous material, and highly expanded, burned and inert argillaceous material in granular form. No. 2,074,758. Lloyd N. Reynolds to Maintenance Research, Ltd., both of Cleveland, Ohio.

Antiseptics composed of hydroxyaryl-alkyl and aralkyl sulfides. No. 2,074,851. Ellis Miller to Sharp & Dohme, both of Phila., Pa.

Composition for preventing flat tires; composed of large mica flakes, more finely divided mica, granulated soft cork, cellulose ester with a liquid consisting of water containing glycerin to prevent freezing in winter; the liquid and cellulose ester forming a viscous coating for the mica flakes. No. 2,074,876. Hans Paul Wagner, Brooklyn, N. Y., to Autosan Corp., of America, New York City.

Semi-plastic composition for repairing punctures in pneumatic tires; comprising water and an intimate mixture of solid substances including an agglutinant; said mixture consisting of an agglutinant, water-insoluble solid fillers, and mica. No. 2,074,926. Willy Kruse, Hamburg, Germany, to Autosan Corp. of America, New York City.

Fire extinguishing composition, that includes a material for smothering flames, and a stable, non-volatile chlorinated organic material of high molecular weight. No. 2,074,938. Jesse O. Reed, Washington, D. C.

Floor covering; in first step adding an aqueous emulsion of fatty oil paint to an aqueous dispersion of paper pulp. No. 2,074,964. Louis Leonard Larson and David Lindsay, Jr., to Krafelt Corp. of America, all of Wilmington, Del.

Dry cleaning apparatus and fluid circulating system. No. 2,075,010. Louis Angelus, New York City, and Daniel Lawrence Baylis, Long Island, N. Y., Bailis assignor to Angelus.

Production roofing element comprising a body made wholly of hardened plastic material. No. 2,075,058. Thos. Robinson, Smithtown, N. Y., to Lancaster Processes, Inc., New York City.

Moisture proofing composition for sheets or films comprised of cellulose acetate. No. 2,075,106. Chas. R. Fordyce, Rochester, N. Y., and Harold F. Robertson, Pittsburgh, Pa., one-half to Carbide & Carbon Chemicals Corp., New York City, and one-half to Eastman Kodak Co., Jersey City, N. J.

Process making a porous soil layer impervious to fluids. No. 2,075,244. Jan van Hulst, Amsterdam, Netherlands, to Patents & Licensing Corp., Boston, Mass.

Setting of rubber hydrochloride transparent sheets; using a solution of a butadiene polymer hydrohalide and a vulcanizing agent. No. 2,075,255. Erich Gebauer-Fuelnegg, Evanston, Ill., to Marbon Corp., corporation of Del.

Disinfecting dispensing apparatus. No. 2,075,266. Earle L. Bowman, Attleboro, Mass.

Production horticultural binding tape, comprising a flexible, self-sustaining sheet of wax and rubber. No. 2,075,327. Allen Abrams, Charley L. Wagner, and Geo. W. Forcey, Wausau, Wis., to Marathon Paper Mills Co., Rothschild, Wis.

Preparation insecticide comprising a fluosilicate of an organic base. No. 2,075,359. Paul Lawrence Salzberg and Euclid Wilfred Bousquet to du Pont, all of Wilmington, Del.

Preparation metal polish consisting of tripoli powder, vinegar, powdered beeswax, diatomaceous earth, water (rain), white corn meal, and condensed milk. No. 2,075,362. Ida Selleck and Florence Ray, Ypsilanti, Mich.

Production lacquer comprising an ethyl cellulose having at least one ethyl group per glucose unit. No. 2,075,376. Richard T. Ubben to du Pont, both of Wilmington, Del.

Preparation wood preserving and fireproofing composition, consisting of zinc and iron chlorides, boric acid, ammonium phosphate, and water. No. 2,075,693. Cornelius D. Bell, Jr., Detroit, Mich.

Prepared roofing material comprising felt fibrous base impregnated with waterproofing material and coated with a layer of bitumen, said coating having filler comprising pulverized scrap asphalt roofing. No. 2,075,751. Ralph W. B. Reade, Newton Center, Mass., and Harold L. Levin, Nutley, N. J., to Patent & Licensing Corp., Boston, Mass.

Manufacture a waterproof insulation material consisting of a fibrous elastic core and a covering sheet. No. 2,075,835. Allen L. Spafford, Cloquet, Minn., one-half to Wood Conversion Co., Cloquet, Minn., and one-half to Paper Service Co., Cincinnati, O.

Manufacture varnish compositions; heating together a drying oil, an oil-soluble synthetic resin, and a neutral phenol ester of a dibasic carboxylic acid. No. 2,075,839. Victor H. Turkington, Caldwell, N. J., to Bakelite Corp., New York City.

Sealing compound comprising rosin, hydrated lime, and abietic esters. No. 2,075,885. Geo. R. Carlson, Newark, N. J., and Robt. J. Stoetzel, Union, N. J., to Western Electric Co., Inc., New York City.

Bleaching compound in powdered form, consisting of calcium hypochlorite and mono calcium phosphate. No. 2,075,913. Pedro Sanchez, Buffalo, N. Y.

Manufacture wetting, sudsing, emulsifying and detergent agents. No. 2,075,915. Arnon O. Snoddy and Wilfred S. Martin to Procter & Gamble Co., all of Cincinnati, Ohio.

Method of forming insulating material. No. 2,076,078. Arthur H. French to A. E. Staley Mfg. Co., both of Decatur, Ill.

Production chewing gum, using rubber, a resinous material, and talc. No. 2,076,112. John O. Barker to Sweets Labs., Inc., both of New York City.

Method bleaching leatherboard; by treatment with an aqueous solution of an alkali binoxalate. No. 2,076,159. Herman W. Richter to Geo. O. Jenkins Co., both of Bridgewater, Mass.

Preparation substituted sulfonic acids of high wetting, dispersing, and emulsifying power. No. 2,076,166. Ernest Segessemann, Newark, N. J., to National Oil Products Co., Harrison, N. J.

Container and dispensing device for powdered soap, etc. No. 2,076,323. Archie Campbell Reeve, Hounslow, England.

Manufacture compressed board having an exposed gypsum surface. No. 2,076,349. John M. Porter and Geo. H. Way, Elizabeth, N. J., to American Cyanamid & Chemical Corp., New York City.

Adhesive mixture comprising casein, biuret, and water. No. 20,326. Reissue. Edward F. Christopher to Industrial Patents Corp., both of Chicago, Ill.

Preparation a bleaching material. No. 2,076,545. Lyle Caldwell, Los Angeles, Cal.

Manufacture leather substitute; first impregnating a woven fabric and a layer of wadding, felt, or low density alpha cellulose paper on one or both sides with a solution of vulcanizable rubber compound. No. 2,076,636. Albert J. Hanley to Respro, Inc., both of Cranston, R. I.

Emulsifying agent comprising a continuous oily phase, an aqueous dispersed phase, and a sapogenin. No. 2,076,794. Chas. E. Sando, Washington, D. C.

Weed killing preparations in highly dispersed form, containing ammonium chloride and a water-soluble heavy metal salt. No. 2,076,917. Georg Pfuetzer and Hermann Losch, Limburgerhof, Germany, to I. G., Frankfort-am-Main, Germany.

Production artificial leather, comprising a paper-like web of comminuted separator and fibres permeated with a binder, and a smooth flexible coating on one surface of web. No. 2,077,015. Elmer C. Schacht to Behr-Manning Corp., both of Troy, N. Y.

Preparation disinfectant and deodorant compound; combining formaldehyde with sodium metasilicate to give a definitely alkaline product. No. 2,077,060. Alex. R. White, Mimico, Ont., Canada, to Deodor-X-Co. of Canada, Ltd., Montreal, Que., Canada.

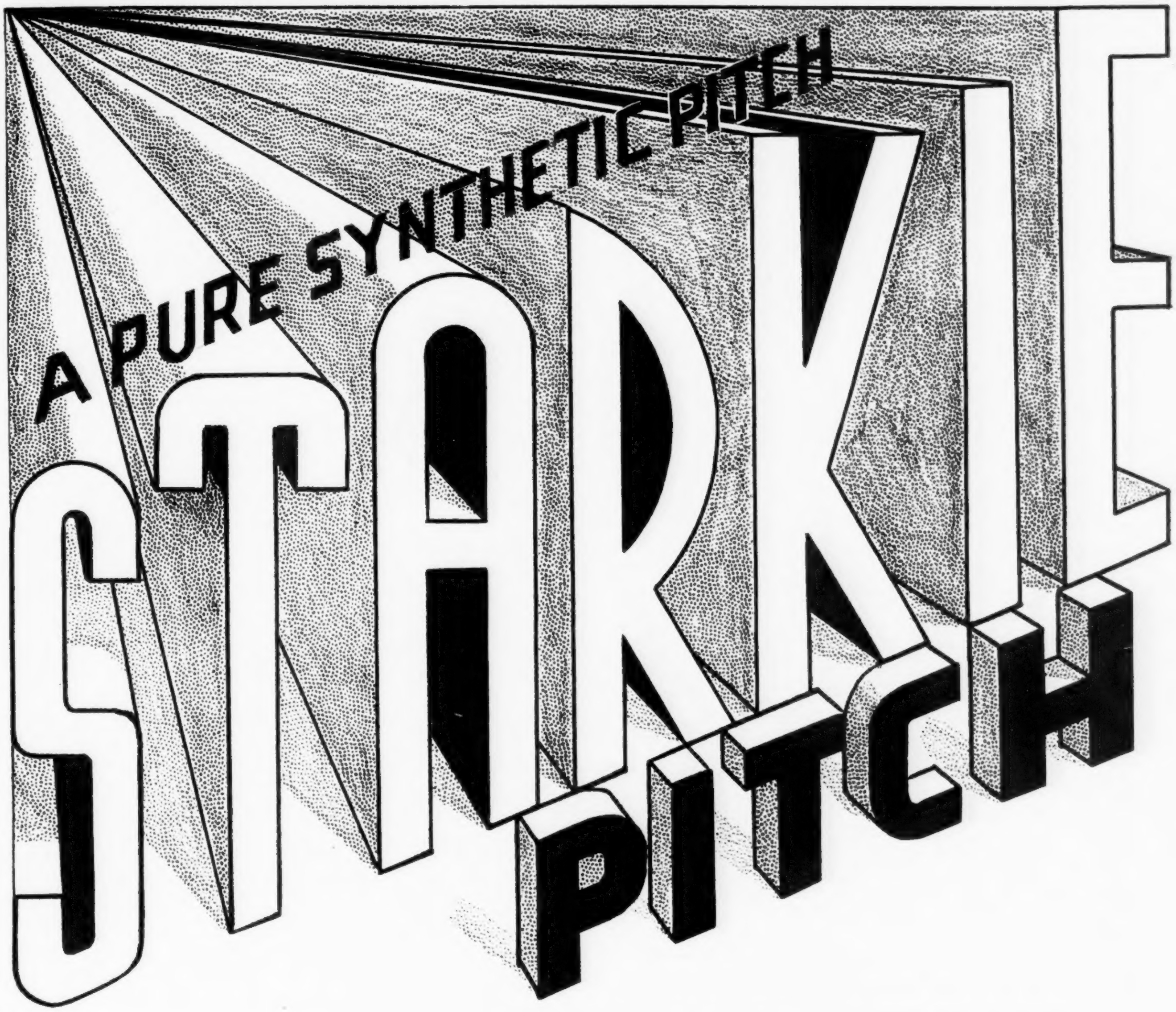
Production building material comprising expanded vermiculite having baked therein an emulsified resinous binding material. No. 2,077,094. Wm. Byers, Kansas City, Mo.

Manufacture porous brick comprising mixture of a suitable carbonate and chrome ore. No. 2,077,096. John B. Carpenter, Jr., West Roxbury, and Earl P. Stevenson, Newton, Mass., to Arthur D. Little, Inc., Cambridge, Mass.

Bleaching process; using accelerators free of heavy metal and hydrogen peroxide. No. 2,077,103. Ehrhart Franz, Leipzig, Germany.

Laminated shoe stiffener characterized by its thermoplasticity, using thermoplastic compound in process. No. 2,077,125. Harold S. Miller, Quincy, and Chas. P. MacIver, Newton, Mass., to Beckwith Mfg Co., Dover, N. H.

Concrete for making porous and air-penetrable bodies, using mixture of silica, iron and aluminum oxides, magnesium and calcium carbonates. No. 2,077,374. Anton Grossinger, Milwaukee, Wis.



A non-toxic synthetic pitch produced from a pure vegetable base. Available in the following melting-point ranges: 65-75; 85-90; 105-110; 115-125; 125-135; 145-150 degrees Fahrenheit.

Starkie's synthetic pitch is being used increasingly in the manufacture of the following: Asphalt Floor Tile, Various Bituminous Products, Insulating Impregnating Compounds, Paints, Paper, Insulation Materials, Waterproofing Materials, Sealing Compounds, Textile Products, Roofing, etc.

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1645 S. KILBOURN AVE. CHICAGO, ILLINOIS

Census Counts Specialty Makers

Distinct Classification Given this Industry in Biannual Record of U. S. Manufactures for the First Time—Great Growth Shown—

Chemical specialty business is for the first time recognized by Uncle Sam in the Census of Manufactures, for in the 1935 biannual issue, figures on which are just being released, this industry receives a distinct classification. This includes compounds and preparations for industrial, agricultural and household fields, including all those which are not of a medicinal or cosmetic character. The figures reveal that in the past two years this business has virtually doubled in all of its significant statistics:

Summary for the Industry*

	1935	1933
Number establishments	546	342
Wage earners	3,466	1,964
Wages	$3,401,387	$1,836,145
Cost of materials, containers, fuel, and purchased energy	24,363,531	13,573,351
Value products	53,429,197	30,973,659
Value added manufacture	29,065,666	17,400,308

* Plants with an annual production of less than $5,000 not included.

Products, by Kind, Quantity, and Value

(No comparable figures for 1933 are available)

	1935
1. Patent and other industrial and household chemical compounds industry, all products total value	$53,429,197
2. Patent and other industrial and household chemical compounds	48,072,703
3. Other products (not normally belonging to the industry)	5,356,494
4. Patent and other industrial and household chemical compounds made as secondary products in other industries	18,011,533
Patent and other industrial and household chemical compounds, aggregate value (sum of 2 and 4)	$66,084,230
Deodorants, other than for human use, value	$726,295
Disinfectants and insecticides, total value	$37,268,449
Disinfectants and insecticides reported by kind—	
Agricultural insecticides and fungicides, total	$15,311,231
Calcium arsenate—	
Pounds	42,966,189
Value	$2,302,844
Lead arsenate—	
Pounds	45,099,137
Value	$4,129,464
Lime-sulfur, dry—	
Pounds	7,652,441
Value	$423,940
Lime-sulfur, solution—	
Gallons	10,092,355
Value	$989,269
Paris green—	
Pounds	2,640,256
Value	$491,948
Other agricultural insecticides and fungicides, including nicotine sulfate and sulfur dust, value	$6,973,766
Household insecticides and repellents, total value	$14,504,932
Fly sprays—	
Pounds	23,140,976
Value	$5,686,342
Insect powder (pyrethrum)—	
Pounds	3,693,971
Value	$1,317,239
Fluoride powders and mixtures—	
Pounds	804,370
Value	$424,750
Moth repellents—	
Pounds	3,502,063
Value	$918,140
Household insecticides and repellents, not reported by kind, value	$6,158,461
Disinfectants and insecticides not reported by kind, value	$7,452,280
Boiler compounds, value	$5,671,434
Other industrial and household chemical compounds, value*	$22,418,058
Blackings, stains, and dressings industry, all products, total value	$17,931,563
Other products (not normally belonging to the industry)	2,331,951
Blackings, stains, and dressings, total	15,599,612
Blackings	1,559,419
Stains	780,475
Dressings (waxes, automobile top, etc.)	711,917
Boot and shoe polishes	10,646,653
Stove polish and leather polishes (harness, belting, etc.) other than boot and shoe polishes	1,901,148

* Includes chemical compounds for waterproofing and insulating, metal treating, oil treating, household tints and dyes, etc.

Sanner Goes West

Harry C. Sanner, Jr., for the past three years representing McCormick Sales Co., Baltimore, in the south, has been put in charge of the San Francisco office.

Wexler Sells Out Winsor Wax Interest

Irving Wexler has sold his interest in the Winsor Wax Co. to the estate of his old partner, L. E. Fleischman, and will devote his entire time to the business of the Buckingham Wax Co., Long Island City, N. Y., of which he is president. The Winsor company will continue under the active management of Jacob Klein, former vice president, who becomes general manager.

F.T.C. Rulings of the Month

Complaint against Cummer Products Co., Bedford, Ohio, charged with unfair competition in the sale of cleaning fluid, "Energine," has been dismissed by the Federal Trade Commission.

Cease and desist orders for misleading advertising were issued during the past month against Kalo Inoculent Co., Quincy, Ill., for legume inoculents; Tarson Chemical Co., cleaning powders; Western Michigan Chemical Co., Muskegon, Mich., for "Chlorite" and Clorox Chemical Co., Oakland, Calif., for washing fluid.

Tax of 2½c on Tapioca Proposed

Tax of 2½ cents per pound on imported tapioca, crude tapioca, tapioca flour, sago, crude sago, sage flour, or cassava, "whether or not such products or any of them have been refined, modified, or otherwise processed, and in whatever combination or mixtures containing a substantial quantity of any one or more of such products," is proposed in a bill (H.R. 5931) introduced in the house by Chester Thompson (Ill.).

Soybean Glue Patents Infringed

Balfour, Guthrie & Co., manufacturing soybean glue under license from I. F. Laucks, Inc., covering five broad patents, but certain divisional and subsidiary patents claimed that since they were licensed under the broad patents they were necessarily licensed under the subsidiary patents. Laucks sued Balfour Guthrie for infringement of the subsidiary patents. The U. S. District Court, Judge Edward E. Cushman, held that the three subsidiary patents (Nos. 1,854,703, 1,845,427 and 1,883,989) were infringed by Balfour Guthrie, that their license was restricted to the specific grant of the claims of the five original patents licensed to them. On two of the patents he ordered an injunction against future infringement, but held that since infringing acts ceased upon notice that no accounting was necessary. On the other patent, No. 1,854,703, where the infringing acts were not ceased upon notice, he ordered an injunction against future infringement and an accounting as to profits and damages.

Du Pont's New Flame Retardant

A new flame-proofing agent for textiles and paper was displayed and demonstrated (see Specialties Dept. title page this issue) at their exhibit in New York last month by the duPont Co.

Textiles and paper treated with this new chemical are highly flame-proof and at the same time have a soft, pleasing "feel." In addition, this new chemical does not have appreciable influence on strength or dyeing properties.

Textiles and paper treated with fire retardants are not fire-proof in the sense that they cannot be burned, but in that they do not blaze or smolder, and accordingly will not spread a fire. During recent years much research has been directed to the development of a satisfactory flame-proofing agent but all materials used for this purpose had certain disadvantages which limited their usefulness. The du Pont Co. expects to manufacture this new material on a commercial scale this year.

Gartenberg Opens in Des Moines

H. Gartenberg and Co., Chicago, makers of specialty tanstuffs, with plants in Chicago, Kansas City, and Minneapolis, has leased the Globe Tanning Co. building, 222 S. E. First st., Des Moines, and will open as soon as necessary alterations can be made.

International Printing Ink Becomes Interchemical

The International Printing Ink Corp. was rechristened Interchemical Corp. at the annual meeting of the stockholders. The old name will be continued for the printing ink division of the corporation.

Law to Control Soot Removers

Drastic Measure Proposed in Connecticut Governing Making and Selling of this Class of Chemical Specialties—

A bill controlling the manufacture and sale of soot removal compounds has passed the Connecticut Senate and is now before the House. It orders manufacturers of these compounds to send samples to the State police for analysis before they are placed on public sale, and establishes a $50 license fee. The proceeds from the fees will be used to defray expenses for analyzing the compounds.

State Commissioner of Police is directed to prepare and enforce "reasonable regulations for the safe manufacture, storage, transportation and use of chemical, mineral or metallic compounds used or intended to be used for the purpose of removing soot and scale from furnaces, steam boilers, flues or chimneys."

The bill also orders that all engaged in the manufacture or distribution of these compounds shall first make application to the State Police Commissioner, and then submit his samples and fee. A certificate of approval from the commissioner must be secured before manufacture or distribution can begin.

Sale of such compounds without approval is punishable by fine of not more than $500 or imprisonment for not more than six months or both.

Tamms Has Five New Items

Tamms Silica Co., Chicago, have added to their line of coatings specialties five new products, as follows: Casein tinting colors; nine colors, illustrated on a chart, available in concentrated powder or paste, mixing only with water, these paints are washable. Double duty caulking compound; ready for use with gun or tool, which, because of its versatility, only one grade need be carried for every requirement. Tamms linoleum paste contains no injurious chemicals, spreads with ease and is a smoothie as well. Prim, a new rug and carpet shampoo comes in paste and mixes with water; is non-harmful, and is recommended for cleaning delicate fabrics, valuable rugs and draperies. Plastic iron cement, for filling small cracks in radiators, steel or iron pipes, water jackets and the like, comes in powder form and mixes with water to produce a plastic putty.

New Naphthenic Soaps Offered

S. Schwabacher & Co., petroleum specialties, New York City, has two new products on the market. One is a soluble residue; the other is insoluble. The first forms a transparent solution with hot water; the insoluble variety dissolves in hot water, but the solution is slightly opaque. Both are alkaline in reaction. Pursuant to analyses the W. S. Purdy Company, consulting chemists, report as follows on their composition and characteristics:

	Soluble	Insoluble
Water	6.5%	3.5%
Ash	12.9%	16.2%
Mineral oil	1.5%	1.3%
Naphthenic acid	81.9%	77.9%
Specific gravity (15.5°C.)	1.0463	0.9841
Free alkali (as NaOH)	0.17%	0.6%
Cold test	0° F.	—5° F.

Beacon Invades Mexican Market

Beacon Co., Boston, maker of metallic soaps and other industrial specialties, has appointed Industrias Bruning, Apartado 2330, Calle T Tintoreto, Mexico, D. F., to represent them in Mexico.

New Names in the Specialties Field

Flieg Chemical Co., Indianapolis, has changed corporate title to Inland Chemical Co.

Textiles Sales Corp., Concord, N. C., has been incorporated for $50,000 ($300 paid in) to deal in textile chemical specialties.

Green Bay Chemical Co. has been organized by P. O. Cornelisen to job laundry and janitors' supplies at 803 Oregon st., Green Bay, Wis.

Lone Star Chemical Co., incorporated by J. E. Briscoe, J. L. Maverick, F. B. Hoover, San Antonio, Texas, capital stock $8,000.

Queen Ant Control, Inc., organized by A. C. Helmbrecht, Carl and B. J. Ludwig, to make and market ant poison.

N. A. I. & D. M. to Meet June 7 and 8

National Association of Insecticide & Disinfectant Manufacturers will meet Monday and Tuesday, June 7 and 8, at the Edgewater Beach Hotel, Chicago.

Sulphonated Oil Manufacturers' Assn. will combine its next business meeting with an outing May 21 and 22.

Fulton Dye & Import Co., U. S. agent of Centrale des Matieres Colorantes, Paris, France, has increased and centralized its offices, laboratories, and warehouse at 250 W. Broadway, New York City.

Baldwin Laboratories are spending over $200,000 on radio advertising for their household insecticide "Dwin."

Rex Research Corp., Toledo, have put their advertising in the hands of the Gordon Vlchek Agency.

Obituaries

Richard Baybutt—H. S. Eckels C. E. Trees—J. C. Brown—

Richard Baybutt, 85, Wollaston, owner of the Hub Dyestuff & Chemical Co., Boston, died at his home at Wollaston, April 10, after a short illness. He retired from active business five years ago. He was a member of the Episcopalian Club, the Engineers Club, the Drysalters Club, the Victorian Club, and the St. Paul and St. Mathews Lodge A. F. & A. M. of South Boston.

He leaves his widow, Mrs. Mary A. (Cartwright) Baybutt, two sons, Herbert and Richard, and four daughters, Mrs. Samuel Tilden Ladd of Portsmouth, N. H., Mrs. Ethel Winterton of Manchester, N. H., Mrs. James Walton of South Boston, and Mrs. Gertrude Barnard of Boston.

Howard S. Eckels, pioneer chemical specialty maker, died April 5 at his home, "The Highlands," Wyncote, Pa. Mr. Eckels was born in Mechanicsburg, Pa., was president of H. S. Eckels and Co., Inc., and also dean of the Eckels College of Embalming. He was a member of the Rotary Club, and a director of the Pennsylvania Golf Association, the Manufacturers' Country Club, Penn A. C., Manufacturers and Bankers Club, Downtown Club, Beaver College and Union League, president of the Senior Golf Association and past president of the board of Cedarbrook Country Club.

Junius G. Brown, vice-president in charge of the New York City office, Vanilla Laboratories, Rochester, N. Y., died March 22 in a hospital in Orange, N. J.

Charles Emment Trees, 49, founder and president of C. E. Trees Co., manufacturers of flavors and extracts, died April 12 in his home in Indianapolis. After being graduated from Frankfort High School, he attended the University of Illinois and then transferred to Purdue, graduating in pharmacy in 1910. He became a salesman and later sales manager for Hurty-Peck & Co., Indianapolis extract manufacturers. He established the firm that bears his name in 1929.

Lee F. Spring, an employe of the Cole Chemical Co., St. Louis, and formerly connected with various advertising and printing firms, died April 13 at his home in Chautauqua, Ill., of a heart ailment. He was 77 years old.

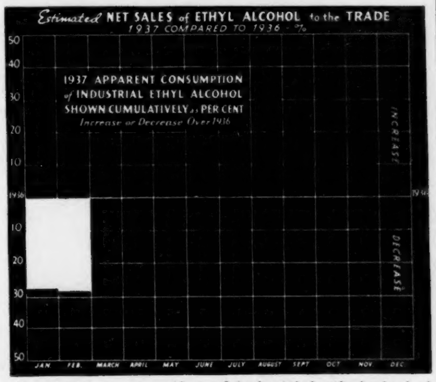
"Sanovan" (deodorant) is being pushed in New England by the Cosmos Chemical Corp., Boston, in local newspapers and radio stations.

Prepared Monthly by the U. S. Industrial Chemical Co., Inc.

SOLVENT NEWS

Reg. U. S. Pat. Off.

MAY ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1937



Apparent consumption of industrial ethyl alcohol from Jan. 1 to Feb. 28, 1937 was 9,678,000 wine gallons. This is 28.3 per cent less than during the same period in 1936 when 13,493,000 wine gallons were consumed.

TREASURY DEPT. MAKES NEW FIELD ASSIGNMENTS

Stewart Berkshire, deputy commissioner of Internal Revenue, Washington, D. C., recently announced in AT-Circular No. 272 the following assignment of field personnel, effective April 6th, 1937:

William D. Moss, District Supervisor, District No. 2, New York, N. Y.

William E. Dunigan, Assistant Supervisor (Enforcement), District No. 2, New York, N. Y.

Paul D. Clutton, Assistant Supervisor (Permissive), District No. 2, New York, N. Y.

William N. Woodruff, Assistant Supervisor (Enforcement), District No. 4, Newark, N. J.

Earl E. Koehler, Chief, Enforcement Division, Washington, D. C.

TESTS MAY EXTEND USE OF SHELLAC AS PLASTIC

Recent studies on the baking and heat hardening property of shellac are reported to reveal that it is similar to the heat conversion of phenol-formaldehyde resins.

In the investigations, shellac samples in glass tubes were heated until the reaction was complete. This was assumed to have been reached when a glass rod extending into the shellac returned to its original position after twisting and release. Conversion times from 227 minutes at 120° C. to 6 minutes at 250° C. were found.

The influence of 10% concentrations of accelerating and retarding agents was determined by finding their acceleration factor at 180° C.; i.e., the ratio of the conversion time for pure shellac to that for shellac plus agent. Acceleration factors were given: hexamethylene tetramine 9.0; thiourea 5.8; urea 4.5 and sulfuric acid 3.0. In general, all ammonium salts acted as accelerators. Some retarding factors obtained are: sodium hydroxide 99; potassium hydroxide 44; sodium acetate 11 and diethyl urea 1.3. Numerous substances proved to exert no influence on the heat conversion of shellac, according to the report.

Other experiments showed that pressure retards the conversion. This may prove a serious disadvantage in the application of shellac to molding, it is asserted.

Plastic Bearings in Germany

Widespread use of synthetic plastics in place of metals for bearings has resulted from recent economic conditions in Germany, according to reports. Molded bearings for such heavy machinery as rolling mills are available. It is claimed that the higher initial cost of molded resin is more than offset by economies in power consumption, lubricants and replacement.

QUICK-SETTING ADHESIVES ARE MADE WITH PLASTICIZED ETHYL CELLULOSE

Dialkyl Phthalates Meet Requirements for Plasticizer; Alcohols and Esters Suitable for Solvent Types

Thrusting into the background, the old "all-purpose" adhesive, manufacturers have during the past several years, developed new, specialized materials formulated for individual uses. For example, when called upon to meet the problem of laminating two cellulose acetate sheets, they developed an adhesive that took into account such functional properties as thermal stability, flexibility and resistance to discoloration by sunlight.

One of these newer materials which is being carefully surveyed for many additional uses is ethyl cellulose. This younger member of the cellulose ether family has shown great possibilities because of its toughness, compatibility with resin-plasticizer mixtures and ready solubility in a wide variety of organic solvents. Thus, by proper selection of resin and plasticizer it is possible to make adhesives of the hot melt type or adhesives with a solvent base, depending upon the type of application.

Proper Plasticizers

The hot melt type can be formulated with as little as 8 percent ethyl cellulose with the balance resins and plasticizers. Among the resins found suitable for this use are dewaxed damar, kauri, phenol resins (certain types) and ester gum. Selection of the proper type of plasticizer is primarily dependent upon compatibility of that plasticizer with ethyl cellulose, although, for many uses, such plasticizer qualities as color, stability to light and heat and freedom from odor and taste are of the utmost importance.

Four plasticizers which meet all these requirements are available from the U. S. Industrial Chemical Co., Inc. These are the diamyl, diethyl, dibutyl and dimethyl phthalates.

One striking characteristic of hot-melt adhesives is the unusual rise in melting point resulting from the addition of ethyl cellulose.

(*Continued on next page*)

SOLVENT NEWS MARKS FIFTH ANNIVERSARY

U.S.I. Receives Over 6,000 Letters From Readers During 5 Years

More than 6,000 letters from chemists and executives demonstrate the following which *Solvent News* has acquired since its inception five years ago this month. Reaching over 50,000 readers in the chemical industry, *Solvent News* appears monthly in the "Oil, Paint & Drug Reporter," "Industrial & Engineering Chemistry," Chemical & Metallurgical Engineering" and "Chemical Industries." It is also mailed as a special edition to those who find it convenient to have file copies readily accessible. This service is extended without charge to responsible executives and chemists.

Through this medium U.S.I. has endeavored to serve the users of industrial solvents by providing a clearing house for technical information. Manufacturers are invited to submit articles of interest on their new products in this field for publication in *Solvent News.*

PLASTIC CEMENT for mending leaky seams in petroleum equipment; a material which facilitates the painting of damp surfaces; new transparent cellulose wrapping and other interesting specialties are described in the "Technical Developments" column on the next page. For further information, write to U. S. I.

U. S. I.'S GIANT POWER ARTERY

LIKE A GIANT ARTERY this 12-in. diam. steam line winds sinuously above a mile and a half of terrain joining the plant of the U. S. Industrial Alcohol Co. to that of the U. S. Industrial Chemical Co., Inc. at Baltimore, Md. It is hailed as a major engineering feat in welded pipe-line construction.

MAY ★ SOLVENT NEWS ★ 1937

HIGHER PHTHALATES MADE NEW, FAST WAY

Temperatures ranging from 160° to 260° C. and pressures as high as 5000 lbs. per square inch are the solution to the old problem of rapid quantitative hydrogenation of dialkyl phthalates to the corresponding dialkyl hexahydrophthalates, according to a recent patent.

A highly active nickel catalyst on a kieselguhr base enables the reaction to proceed to quantitative hydrogenation in as little as 15 minutes, it is asserted. The hydrogenation products of dimethyl-, diethyl-, diamyl- and higher phthalates are said to be useful as solvents, plasticizers, perfume fixatives and intermediates.

Colorings for Plastics

Instead of coloring molded plastics, or the molding powders from which they are made, with ordinary coal tar dyes it is advantageous to color cellulose derivatives, and natural or synthetic resins with metal compounds of certain selected dyes, according to a British patent. For example, a cellulose acetate plastic with titanium dioxide filler is colored by adding the copper compound of Naphthochrome Azurine B to a cellulose acetate lacquer, and compounding with more cellulose acetate and the filler in proportion to make a molding composition.

ANHYDROUS ALCOHOL UPS YIELD OF ALCOHOLATES

New Process May Speed Production Of Other Alcohol Derivatives

Further recognition of the importance of anhydrous alcohol in improving the efficiency of various established chemical reactions is brought out in a recent patent of a process for making alkali metal alcoholates.

According to the method outlined, a water-free alcohol of less than four carbon atoms, e.g. ethyl alcohol or methyl alcohol, is caused to react with a special alkali metal amalgam in the presence of an electrically conducting but non-amalgamating electrode in contact with the amalgam and the alcohol.

One additional advantage of anhydrous alcohol, it is stated, is that higher yields of the corresponding xanthates may be obtained by reacting carbon disulphide with an anhydrous alcohol solution of the alcoholates. This is also said to minimize contamination by impurities such as thiocarbonates and sulphides, usually introduced by the presence of water.

An excellent mold lubricant to prevent sticking of rubber articles may be made from 95 parts of denatured alcohol and 5 percent of glycerin, according to a recent report.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A plastic cement designed for mending leaky seams in gasoline and petroleum equipment, etc. has been developed. It is described as self-hardening, impervious to gasoline and oils and, resistant to temperatures up to 350° F.

U S I

Damp surfaces can be painted with ordinary paint, varnish or lacquer when a new compound is added in 1-19 proportion, according to the manufacturer. The compound is said to combine with water, forming a substance which rises to the top of the paint film, decomposes and evaporates.

U S I

Transparent, cellulose wrapping material, said to be highly elastic and fire-resistant, is shortly to be marketed, according to reports. It is said to have been tested as a wrapping for aromatic products under tropical conditions with successful results.

U S I

Permanent delustering is claimed for a new liquid delusterer now on the market. According to the manufacturers, there are no undesirable after-effects such as powdering. Uses suggested include delustering silk and rayon hosiery, underwear and piece goods.

U S I

A laboratory clarity tester for detecting and estimating traces of suspended matter in liquids has been announced. It is said to show clearly, differences of one part per million by simple, visual side by side comparison in stock bottles.

U S I

An electric vibrating barrel packer of low head and high capacity (up to 800 lbs. gross) was announced recently. The manufacturer reports that the packer may be washed with a hose if a water-tight rubber skirt is installed.

U S I

Grease compounded with lead powder is now on the market. This leaded grease is said to have many advantages over graphite grease, including reduced wear and less packing in bearings. Lead powder is also used in pipe-joint and pipe-thread compounds. The manufacturer claims that the lead forms a protective coating on the threads which prevents corrosion and freezing of the joints.

U S I

A rubber compound which is said to incorporate the quality of a primer with a self-curing rubber was marketed recently. The makers state that the product can be applied by dipping, spraying or hand brushing and makes a firm bond in one application. Since the product is 90 per cent pure rubber, the manufacturer reports, there is practically no shrinkage and it gives a smooth, enamel-like finish on any surface.

U S I

A new deodorant has been announced as a substitute for pine tar oil. Suggested uses are in paints, rubber, adhesives, etc.

New Quick-Setting Adhesives for Specialized Uses Are Formulated With Plasticized Ethyl Cellulose

(Continued from preceeding page)

It has also been observed that ethyl cellulose gives an effective action in diminishing the tendency of waxes and resins to crystallize. These adhesives have been used for the lamination of:

1. Cellophane to paper
2. Cellulose acetate to cellulose acetate
3. Cellophane to cellophane
4. Metal foil to cellophane
5. Metal foil to paper
6. Cardboard to cardboard
7. Cloth to cloth
8. Paper to paper

It is reported that formulations of this type may be made to show excellent adhesion at O°C and assure bonding for at least one hour when the lamination is subjected to a dead weight of 20 grams per square inch at a temperature of 45 degrees C.

For many types of work, it has been found more practicable to apply formulations made with solvents rather than depending on heat. Since ethyl cellulose is soluble in a wide variety of organic solvents, selection of the proper type may usually be made from the standard lacquer solvents as well as the aromatic coal tar solvents. Ethyl alcohol dissolves as much as 16 percent by volume of ethyl cellulose. This solution may be made perfectly clear with the addition of toluol. Butyl alcohol, mixed with xylol, also gives a clear solution. Other acceptable solvents are amyl alcohol, amyl acetate, butyl acetate, ethyl acetate, ethyl lactate and acetone. All of these are reported to give good solution with from 5 per cent to 16 per cent ethyl cellulose.

With the exception of hydrocarbons, all the above solvents are supplied by the U. S. Industrial Chemical Co., Inc. Their exact refining methods have reduced to a minimum residual odor so important in solvent adhesive formulations.

Packaging, Handling and Shipping

Freight Rate Increases in Effect But Many Chemical Protests are to be Heard by I. C. C.—

April 20 freight rate increase of 10 per cent. on Class I roads went into effect upon the following chemical commodities:

Sodium acetate, bulk, barrels or double bags.
Licorice mass.
Calcium arsenate, dry.
Lead arsenate (column rates suspended, but the commodity increase allowed).
Explosives and fireworks, 5-cent maximum increase per 100 pounds.
Insecticides and fungicides (column rates suspended, but the commodity increase allowed).
Magnesium sulfate, crude (kierserite), and refined (epsom salt), 2-cent maximum increase per 100 pounds.
Dry earth pigments (blanc fixe).
Barytes ground not precipitated, 2-cent maximum increase per 100 pounds.
Iron oxide hydrated (having value only for gas purifying purposes).
Lead silicate and litharge, 2½-cent maximum increase per 100 pounds.
Sal ammoniac.
Zinc ammonium chloride.
Chlorine, liquefied, in tank cars.
Anhydrous ammonia.
Wool grease (lanolin).
Borate rock.
Chalk, crude, and clay ashes, 2-cent maximum increase per 100 pounds, except that commodity rates published as proportional rates will be increased 1-cent per 100 pounds.
Barium or silicate mud, gas or oil-well drillings containing clay and barytes and/or silicate, 2-cent maximum increase per 100 pounds.
Gypsum, ground or pulverized.
Sienna.
Silica (not silica sand).
Umber.
Copperas, except in Southern territory where there is a "straight" 2-cent increase per 100 pounds.
Aluminum and bronze powder.
Magnesite and crude magnesite, 1-cent maximum increase per 100 pounds.
Caustic calcined magnesite and dead burned magnesite, 2-cent maximum increase per 100 pounds.
Fish scrap, dry, ground or pulverized.
Tankage, (other than feeding, fertilizer or garbage tankage).

Paints and varnishes and paint materials not specifically provided for or covered by other lists were increased 7 per cent., with a 5-cent maximum increase per 100 pounds.

An increase of 7 per cent. on the commodity rate was allowed on boat, floor, furniture or vehicle polish and on boat, floor, furniture, or vehicle wax in a liquid, paste, or dry form. A maximum increase of 5 cents per 100 pounds was placed on this increase.

Flaxseed, plain, ground, or screened was increased to 2 cents per 100 pounds; and sludge or waste lime (the waste in manufacturing caustic soda, a mixture of one-half water and one-half calcium carbonate) was increased 1 cent per 100 pounds.

Protests from shippers were sustained on sodium acetate, bones, insecticides, carbon black, fluorspar and block tin, and the Commission issued investigation and suspension dockets. Hearings are expected on them late in May. The proposed commodity rate increase on insecticides was not suspended, but the proposed change in the class rate on insecticides was suspended.

Shippers also protested other increases, but the Commission allowed the railroads to increase rates. These included turpentine cups, ore, mortar colors, silica, flaxseed, copperas, epsom salt and kierserite, licorice mass, manganese ore, explosives, anhydrous ammonia, satin white, and blanc fixe.

Steel Drum Output Up 25%

Steel barrel and drum U. S. production in 1936, as reported by 34 manufacturers operating 38 plants, totaled 8,608,491, compared with 6,876,650 barrels, reported by 30 manufacturers operating 34 plants, in 1935, and with 6,677,322 barrels, reported by 31 manufacturers operating 36 plants in 1934. Shipments totaled 8,600,493 barrels in 1936, compared with 6,872,452 barrels in 1935, and 6,682,400 barrels in 1934. Operations, ratio to capacity, were reported at 45.8 per cent. for 1936, compared with 38.3 per cent. in 1935, and 36.0 per cent. in 1934.

Bag Seams and Closures

In the selection of a proper bag or liner, there are several important factors in addition to the proper selection of the materials from which the bag or liner is to be made. One of these factors is the type of seam to be used. Another very important factor is the type of closure to be used. The fourth describes the most common types of seams and closures used in the manufacture of FLEXLINED and CORRULINED bags by the Paper Service Co., Lockland, Ohio. The fifth "Data Sheet" is about "X-CREPE" paper so named because the lines of creping, instead of being across the width of the paper, are in two intersecting diagonals. By this intersecting diagonal creping the paper secures "stretchability" in all directions—a characteristic of extreme importance in a great many applications.

A new dustless weighing hopper, furnished with or without a weighing device, for handling all kinds of powders, such as required for manufacturing drugs, cosmetics, paints, chemicals, etc., has just been placed on the market by the Read Machinery Co., Inc., of York, Pa.

Group of Lowe Bros. products with new labels.

$(CH_3)_2C:CHCOCH_3$

MESITYL OXIDE

★

A New Industrial Chemical

THE properties of Mesityl Oxide make it of value both as a solvent and as a raw material for chemical synthesis.

Mesityl Oxide is of particular interest because it is a solvent for some of the vinyl resins and for "synthetic rubber." It is also an excellent solvent for nitrocellulose, ethyl cellulose, for certain grades of cellulose acetate, and for many gums and resins. The technical and patent literature suggest its use in rust removers, in ethylene diamine-ketone condensation products, and in the preparation of anti-oxidants. It is miscible with most organic liquids.

If you are interested in further information concerning this unusual chemical, we shall be glad to send you a sample and complete technical data.

PROPERTIES OF MESITYL OXIDE

Specific Gravity: 0.853 to 0.863 at 20° C./20° C.

Solubility in Water: 3.4% by volume at 25° C.

Flash Point: 25.6° C. (78° F.).

Distillation Range: 110° C. to 140° C. At least 60% distills between 126° C. and 131° C.

Odor: Mild, ethereal.

Melting Point: —59° C.

Refractive Index: 1.4458 at 20° C.

Dielectric Constant: 15.4 at 20° C.

Absolute Viscosity: 8.79 millipoises at 25° C.

Surface Tension: 28.3 dynes per cm. at 24° C.

COMMERCIAL SOLVENTS CORPORATION
U.S.A.

COMMERCIAL SOLVENTS CORPORATION

NEW YORK CENTRAL BUILDING, NEW YORK, N. Y.

PLANTS: TERRE HAUTE, INDIANA; PEORIA, ILLINOIS; WESTWEGO, LOUISIANA; HARVEY, LOUISIANA; AGNEW, CALIFORNIA

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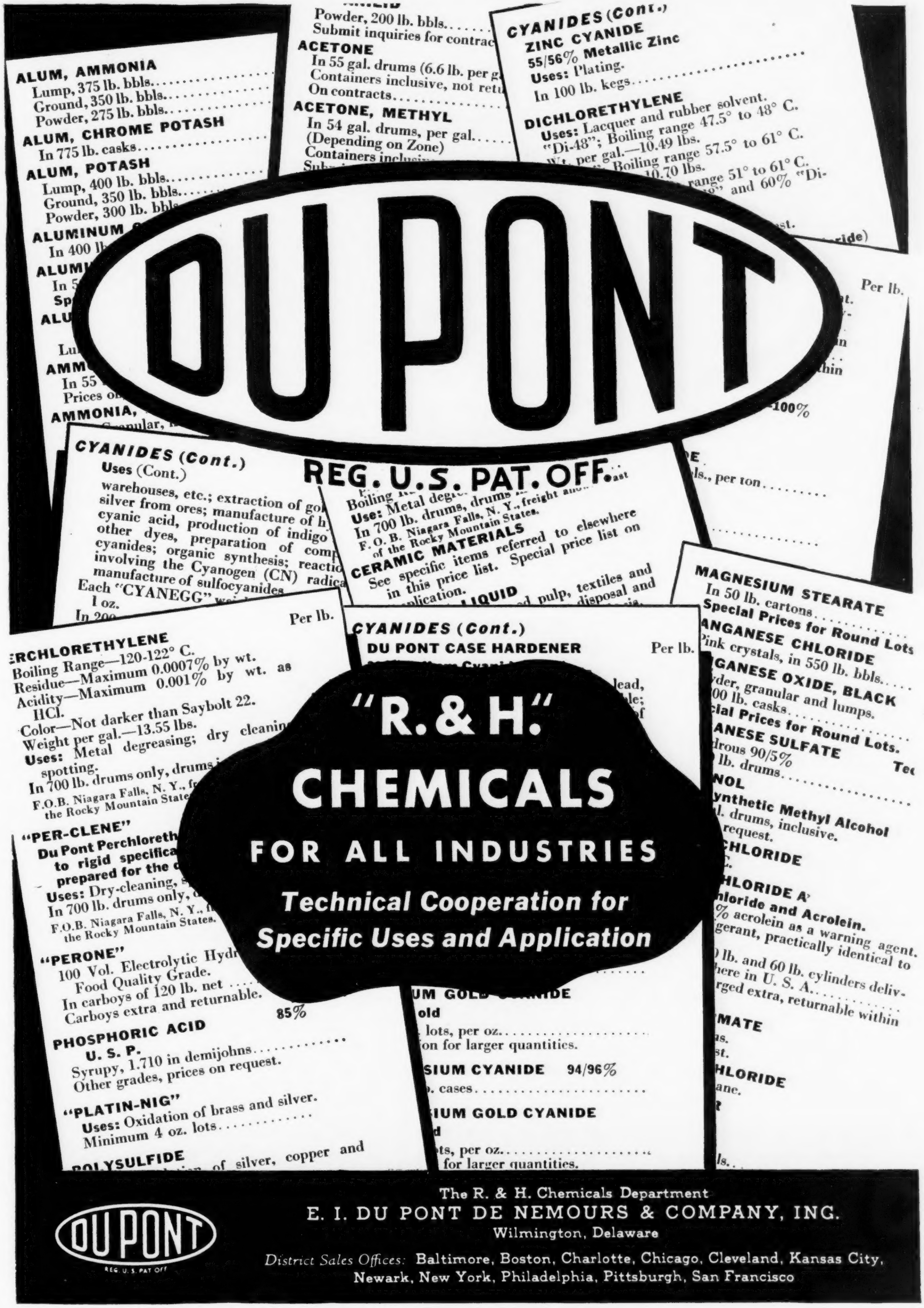

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BLUE BIRD
381,180

CHLORIT
CLEANING COMPOUND
383,387

The UNIVERSAL
387,960

387,922

DITTO
385,836

BLACK FLAG
388,118

PETROLEX
388,208

CUPRINOL
385,134

Nu-Glo
381,257

R-V SUPER-FLO
386,563

GOODYEAR
386,859

POLYTECT
383,457

FLAZ/POL
387,284

DITTO

"Duxoil"
386,438

AMIDAZO
387,738

PRE-PAC
387,036

388,157

386,102

ESCOMET
387,498

SUR-FLO
387,877

Essophalt
387,758

DARIS
388,391

SUPER COPPER
386,995

ALLTAK
381,452

SULROTE
387,913

INLAND
387,900

PONTEX
384,410

PAPERTAK
381,453

FILMCOL
387,918

ONIVAL
388,009

PONTALITE
387,990

CLEARSO
387,952

TABTAK
381,454

NAMCO
388,589

UNITAK
381,456

387,920

Tip Top
PENN
387,095

IF IT NEEDS CLEANING
CLEANSIT
372,758

AL-LON
Freshener
388,216

381,180. West Coast Soap Co., Oakland, Cal.; July 18, '36; granulated laundry soap; use since July '31.

381,257. Canfield Oil Co., Cleveland, O.; July 21, '36: oil soap; use since June 16, '36.

386,438. Midway Chemical Co., Chicago, Ill.; Dec. 7, '36; waterproofing compound for shoes and leather articles; use since Oct. 16, '36.

387,498. Cowles Detergent Co., Cleveland, O., Jan. 6, 37; detergent consisting of sodium meta-silicate with or without other alkalies; use since Dec. 1, '36.

381,452. Graeme Harrison Products, Inc., New York City; July 25, '36; adhesive tapes; use since Mar. 25, '36.

381,453. Graeme Harrison Products, Inc., New York City; July 25, '36; adhesive tapes; use since Mar. 30, '36.

381,454. Graeme Harrison Products, Inc., New York City; July 25, '36; adhesive tape; use since Mar. 25, '36.

381,456. Graeme Harrison Products, Inc., New York City; July 25, '36; adhesive tapes; use since Mar. 25, '36.

383,387. Chlorit Mfg. Corp. (Chlorit Chemical Corp.), Brooklyn, N. Y.; Sept. 18, '36; bleach, deodorant, germicide, and disinfectant, also cleaning compound; use since Sept. 1, '36.

386,563. Calcinite Chemicals, Inc.; Yonkers, N. Y. and New York City; Dec. 4, '36; chemicals or chemical preparations for elimination of rust and scale in boilers and water systems; use since June 15, '36.

386,859. Goodyear Tire & Chemical Co., Akron, O.; Dec. 17, '36; anti-freeze solution; use since Oct. 20, '36.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, March 23 to April 13.

387,738. John Campbell & Co., New York City; Jan. 13, '37; dyes and dyestuffs; use since 1929.

387,877. Refiners Lubricating Co., Inc., New York City; Jan. 16, '37; anti-freeze solution; use since Aug. 1, '36.

387,913. Mechling Bros. Chemical Co., Camden, N. J.; Jan. 18, '37; insecticides; use since Sept. 26, '35.

387,918. Pacific Distillers, Inc., Culver City, Cal.; Jan. 18, '37; denatured alcohol; use since Jan. 6, '37.

387,920. Puritan Soap Co., Rochester, N. Y.; Jan. 18, '37; fluid mixture for use in hydraulic brake systems, and liquefied mixture for stopping leaks in automobile radiators, etc.; use since Mar. 2, '36.

387,960. Geo. W. Yost (Universal Automatic Water Softener & Purifier Co.), Chicago, Ill.; Jan. 19, '37; water softener and purifier; use since July 1, '36.

388,118. Black Flag Co., Balto., Md.; Jan. 25, '37; insecticides; use since 1883.

383,457. American Polytect Corp., New York City; Sept. 21, '36; colored and colorless composition applied in plastic form to walls, etc., to form metallized or non-metallized coating thereon; use since July, '36.

387,036. Flintkote Co., New York City; Dec. 22, '36; mineral wool or similar thermal insulation material; use since Nov. 23, '36.

387,758. Standard Oil Co. of N. J., Wilmington, Del.; Jan. 13, '37; asphalt; use since Dec. 1, '36.

387,900. Globe Roofing Products Co., Inc., Chicago, Ill.; Jan. 18, '37; asphalt composition roofing and building papers; use since Dec. 1, '36.

388,009. E. J. Lavino & Co., Phila., Pa.; Jan. 21, '37; refractory bricks,—plastics and cements; use since Jan 4, '37

387,095. Valvoline Oil Co., Cincinnati, O., and New York City; Dec. 23, '36; lubricating oils and greases; use since Dec. 7, '36.

387,922. Puritan Soap Co., Rochester, N. Y.; Jan. 18, '37; oil for use in shock absorbers for automobiles; use since Aug. 27, '35.

388,208. Water Associated Oil Co., Wilmington, Del., and New York City; Jan. 26, '37; gasoline, lubricating oils and greases; use since Jan. 6, '31.

387,284. Mid-Kent Products Co., Larksfield, England; Dec. 30, '36; polish for motor cars, furniture and finished wood surfaces; use since Oct. 30, '33.

388,157. Union Oil Co. of Calif., Los Angeles, Cal.; Jan. 25, '37; paint thinners and mineral spirits used as a diluent and turpentine substitute; use since Sept. '28.

388,391. Derris, Inc., New York City; Feb. 1, '37; liquid rubless floor wax, and furniture polish; use since Jan. 5, '37.

384,410. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Oct. 16, '36; rubber impregnated fiber sheet material; use since Feb. 1, '36.

387,990. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; Jan. 21, '37; thermoplastic molding powder; use since May 21, '36.

388,589. National Minerals Corp., New York City; Feb. 5 '37; zircon, rutile, ilmenite; use since Dec. 1, '36.

372,758. Lawrence W. Baff, Brooklyn, N. Y.; Dec. 18, '35; chemical compound for cleaning metal and other surfaces, silverware, dishes, and household articles; use since Dec. 2, '35.

385,836. Ditto, Inc., Chicago, Ill.; Nov. 21, '36; liquid and cake soap, and typewriter type and platen cleaner; use since Feb. 8, '29, on soap, and since Apr. 8, '33 on cleaner.

385,134. Cuprinol, Ltd., London, England;

RU

Mobilfuel

Chamberlain

MASTER

ANGELWHITE

VOLCANO

SUN MYTE

KIEREX

CELLUFOIL

ESCOUR

SODYECO

CENTROSENE

IRONMOUNT

TOXCIDIN

Dis FOR DISHES

SYNEKTAN

ICEBERG

IRONSTRONG

POTENTOX

VULTONE

NEOPHAX

FOUR STRONG

DARIS

The PLUMB LINE

NU-LIFE

BRITE X

FLO-DYN

Alrose WITE BRASS

COULEURS J.M.PAILLARD SINCE 1788

LIFE GUARDS SILVER

DARIS

EVERYDAY

LUBRISEAL

Suds-Buds

SANTOVAR

Nov. 4, '36; chemical compositions for waterproofing textiles and for use in manufacture of these goods; use since June, '33.

386,102. Ditto, Inc., Chicago, Ill.; Nov. 30, '36; chemical cleansing cream for removing ink stains and spots, preparation for blocking out ink writing or spots, and a preparation for diluting said blocking out preparation, and a gelatin preparation for forming pads used in duplicating processes; use preparation for removing ink stains from hands since Feb. '29, and applied to said blocking out preparations since Dec. 20, '29, and to gelatin preparation since Sept., '29.

386,895. Hammond Paint & Chemical Co., Beacon, N. Y.; Dec. 18, '36; insecticides and fungicides; use since Nov. 10, '35.

387,952. Phila. Quartz Co., Phila., Pa.; Jan. 19, '37; silicate of soda; use since Jan. 5, '37.

388,216. Al-Lon Mfg. Co., Inc., Balto., Md.; Jan. 27, '37; perfumed deodorizing chemical; use since Jan. 2, '37.

388,241. Phila. Quartz Co., Phila., Pa.; Jan. 27, '37; silicate of soda; use since Jan. 11, '37.

388,107. Soluol Corp., Providence, R. I.; Jan. 23, '37; textile oils (boil-off and scouring) and dyeing and wetting-out agents; use since Mar. 1, '36.

388,277. Leona C. Palmer (L. C. Palmer), Washington, D. C.; Jan. 28, '37; antiseptics; use since Sept. 1, '32.

388,289. U. S. Antiseptic Labs. Corp., Balto., Md.; Jan. 28, '37; mothproofing spray; use since Jan. 10, '37.

388,389. Derris, Inc., New York City; Feb. 1, '37; insecticides and drain pipe cleaner; use since Jan. 5, '37.

388,750. Atlas Powder Co., Wilmington, Del.; Feb. 11, '37; explosives (powder and dynamite); use since Apr. 28, '36.

388,320. International Printing Ink Corp., New York City; Jan. 29, '37; printing inks; use since June 30, '36.

383,355. B. F. Goodrich Co., New York City; Sept. 17, '36; liquid for use in wetting rubber sealing elements; use since Dec. 12, '33.

388,028. Socony-Vacuum Oil Co., Inc., New York City; Jan. 21, '37; petroleum engine fuel; use since Oct. 30, '36.

388,353. Nicola Grassi, New York City; Jan. 30, '37; fuel oil; use since Jan. 3, '35.

388,467. Socony-Vacuum Oil Co., Inc., New York City; Feb. 2, '37; wax derived from petroleum; use since July 5, '33.

388,683. Panther Oil & Grease Mfg. Co., Ft. Worth, Tex.; Feb. 9, '37; lubricating oils and greases; use since Sept. 1, '36.

333,891. Chas. C. Plumb (C. C. Plumb Co.), Providence, R. I.; Jan. 13, '33; asphalt paint; use since Nov. 1, '32.

385,551. Hillman Importing & Trading Co., Inc., New York City; Nov. 16, '36; paint oils; use since Sept. '34.

382,862. Thos. D. Chamberlain (T. D. Chamberlain Chemical Co.), Scranton, Pa.; Sept. 3, '36; varnish, paint remover, wood filler, auto and furniture polish, floor and auto wax, and ready mixed paints; use since June, '32.

387,547. Evans-Walton Co., Detroit, Mich.; Jan. 7, '37; protective siccative coating for auto, marine and other exposed metal surfaces; use since Nov. 6, '36.

388,938. Ironhard Paint & Color Works, Ltd., Los Angeles, Cal.; Feb. 15, '37; ready mixed paints, varnishes, and paint enamels; use since Feb. 1, '36.

388,939. Ironhard Paint & Color Works, Ltd., Los Angeles, Cal.; Feb. 15, '37; ready mixed paints, varnishes, and paint enamels; use since Feb. 1, '36.

387,803. Stamford Rubber Supply Co., Stamford, Conn.; Jan. 14, '37; vulcanized vegetable-fish-and animal oils; use since Dec. 22, '36.

375,643. Albert Isserson (Nu-Life Rug Cleaning Co.), Cleveland, O.; Mar. 6, '36; rug and upholstery cleaner; use since Feb. 1, '35.

388,006. Arthur E. Keller (E. Keller & Sons), Allentown, Pa.; Jan. 21, '37; silver polish; use since Jan. 7, '37.

388,056. Gilbert & Dimitre, Eau Claire, Wis.; Jan. 22, '37; cleaning soap; use since May 15, '36.

388,122. Cowles Detergent Co., Cleveland, Ohio; Jan. 25, '37; detergent for scouring textiles; use since Jan. 10, '37.

388,158. V. C. Products Co., Inc., Phila., Pa.; Jan. 25, '37; soluble cleansing compound for emulsifying and saponifying grease; use since June 1, '36.

388,240. Victor R. Noer (Brite X Co.), Colfax, Wash.; Jan. 27, '37; chemical compound for cleaning glass; use since Jan. 15, '37.

388,390. Derris, Inc., New York City; Feb. 1, '37; toilet bowl cleaner; use since Jan. 5, '37.

388,950. McCoy, Jones & Westlake, Inc., Chicago, Ill.; Feb. 15, '37; soap; use since Jan. 2, '37.

388,579. Louangel Corp., New York City; Feb. 5, '37; shoe cleaner; use since Dec. 28, '36.

385,446. Sarah Monkarsh (Sun Myte Wash Products), Chicago, Ill.; Nov. 12, '36; bleach, deodorant, and disinfectant; use since Apr. '32.

385,703. Southern Dyestuff Corp., Charlotte, N. C.; Nov. 18, '36; dyestuffs; use since Oct. 13, '36.

386,185. Jacques Wolf & Co., Clifton, N. J.; Dec. 1, '36; chemical preparation for tanning leather; use since Apr. 6, '36.

JETAL
387,361

CERCON
388,863

KAPLEX
387,468

GETEM
386,000

MONASTRAL
389,209

Mirpo
389,044

ATF
NON-OFFSET MIX
387,935

CIRENE
389,121

SMITE
388,890

PEN-GUIN
389,027

DY-GERM
388,004

388,204

SS
385,905

SOUTHERN STATES
COOPERATIVE
Quality
387,520

Pyra-Seal
388,160

AQUAGRAF
388,393

AVITEX
388,314

NUFANE
387,589

ZINOX
389,135

Esso
387,355

PYRAMID
382,395

FPH
388,568

SONDAL
389,270

SPO
388,327

ZIN-O-LYTE
389,210

SOHIPOID
388,420

DURAPULP
389,052

CALICO SEED
376,619

CONSUMERS
388,433

PETROSENE
388,468

JEN
381,161

GE-TE-EM
385,999

3-M
389,656

387,121. General Chemical Co., New York City; Dec. 24, '36; insecticides and preparations for control plant pests; use since Oct. 7, '36.

387,350. Reefer-Galler, Inc., New York City; Dec. 31, '36; insecticides, insect exterminators, repellents, deterrents, and preventives; use since Feb. 15, '35.

387,362. Alrose Chemical Co., Providence, R. I.; Jan. 2, '37; salts for use in plating metals; use since Nov. 17, '36.

388,588. Monsanto Chemical Co., St. Louis, Mo.; Feb. 5, '37; chemical adjuvants for animal and vegetable oils; use since Jan. 6, '37.

387,361. Alrose Chemical Co., Providence, R. I.; Jan. 2, '37; salts for treatment of ferrous metal surfaces in oxidizing process; use since Jan. 8, '35.

388,890. Aqua-Sec Corp., New York City; Feb. 15, '37; mothproofing compound, insecticide, fly spray, vermicide, vermin-proofing, used in spray form; use since Sept., '36.

387,520. Southern States Cooperative, Inc., Richmond, Va.; Jan. 6, '37; fertilizers; use since Aug. 22, '33.

382,395. Schechter Bros. Co., Phila., Pa.; Aug. 20, '36; roof coating; use since Mar. 31, '32.

388,420. Standard Oil Co., Cleveland, Ohio; Feb. 1, '37; lubricating oils and greases; use since Dec. 16, '36.

388,468. Socony-Vacuum Oil Co., Inc., New York City; Feb. 2, '37; wax derived from petroleum; use since May 5, '32.

388,863. Conewango Refining Co., Warren, Pa.; Feb. 13, '37; mineral wax; use since Jan. 20, '37.

389,027. Arthur N. Henriksen (Russian Oil Co.), Chicago, Ill.; Feb. 17, '37; lubricating oils and greases.

388,160. Vestal Chemical Co., St. Louis, Mo.; Jan. 25, '37; varnish for floors; use since May 20, '30.

387,589. National Products Corp., Washington, D. C.; Jan. 8, 1937; flexible sheets and materials developed from cellulose materials; use since Dec. 5, '36.

388,568. Florida Humus Co., Zellwood, Fla.; Feb. 5, '37; humus; use since Sept. 15, '32.

389,052. Brown Co., Portland, Me. and Berlin, N. H.; cellulose fibers or pulps; use since Jan. 29, '37.

381,161. Jen, Inc., New York City; July 18, '36; dry cleaning powder; use since Apr. 6, '36.

387,468. Kali Mfg. Co., Phila., Pa.; Jan. 5, '37; soap powder for degumming silk, and scouring materials for textiles; use since Jan. 6, '31.

389,044. Samuel Steinberg (Mirpo Products Mfg. Co.), LaPorte, Ind.; Feb. 17, '37; polish for silver and other metals, glass, china, enamels, etc.; use since June 27, '33.

385,905. S S Rubber Cement Co., Chicago, Ill.; Nov. 23, '36; adhesives and pastes of a flexible nature, having rubber or latex as base; use since Oct. 1, '29.

389,135. I. F. Laucks, Inc., Seattle, Wash.; Feb. 19, '37; glues and adhesives; use since Feb. 8, '37.

389,270. Max Sondheimer, Stuttgart, Germany; Feb. 23, '37; glue and glue powder; use since Feb. 20, '34.

376,619. Howard E. Bagnall (Bagnall Co.), Kansas City, Mo.; Mar. 31, '36; exterminator for rats, etc.; use since Feb. 11, '36.

385,999. Vereinigte Chemische Fabriken Kreidl, Heller & Co., Vienna, Austria; Nov. 25, '36; colors and coloring agents used in manufacture glass and enamelware; use since June 13, '31.

386,000. Vereinigte Chemische Fabriken Kreidl, Heller & Co., Vienna, Austria; Nov. 25, '36; colors and coloring agents for manufacture of glass and enamelware; use since May 16, '36.

387,935. American Type Founders Sales Corp., Elizabeth, N. J.; Jan. 19, '37; compound to be sprayed on sheets after they have been printed to prevent offsetting; use since Apr. '36.

388,204. John Bene & Sons, Inc., Brooklyn, N. Y.; Jan. 26, '37; peroxide of hydrogen; use since May 1, 1909.

388,314. E. I. du Pont de Nemours & Co., Wilmington, Del.; Jan. 29, '37; softening and finishing agent for textiles, paper, leather, etc., also used in washing, dyeing, printing and finishing of such materials; use since Aug. 3, '36.

388,327. Martin Dennis Co., Newark, N. J.; Jan. 29, '37; silk preserving oil; use since Feb. 17, '36.

388,433. Consumers Oil Co., Baltimore, Md.; Feb. 2,'37; lubricating oils and greases, transmission greases, fuel oils, and gasoline; use since Mar. 17, '28.

389,209. E. I. du Pont de Nemours & Co., Wilmington, Del.; Feb. 17, '37; dyestuffs; use since Aug. 25, '36.

389,121. Davies-Young Soap Co., Dayton, Ohio; Feb. 19, '37; quick-drying liquid wax; use since Feb. 5, '37.

388,004. A. C. Horn Co., Long Island City, N. Y.; Jan. 21, '37; paints; use since Nov. 1, '36.

388,393. Grafo Lubricants Corp., Sharon, Pa.; Feb. 1, '37; lubricating oil and grease compound; use since July, '36.

387,355. Standard Oil Co. of New Jersey, Wilmington, Del.; Dec. 31, '36; asphalt; use since Aug. 31, '35.

389,210. E. I. du Pont de Nemours & Co., Wilmington, Del.; Feb. 17, '37; chemical compounds and brightening agents for zinc plating; use since Sept. 24, '36.

389,656. Minnesota Mining & Mfg. Co., St. Paul, Minn.; Mar. 4, '37; polishing wax for furniture, etc., and lacquer polishes for automobile finishes; use since Jan., '37.

CHEMICAL

NEWS & MARKETS

Casein Company's president, William Callan, nominee for Chemists' Club presidency

Court Rules on Formulas, Oil Tax, and Carbon Black

Three Decisions Touch Chemical Interest Closely—Washington Jittery—New Laws and Appropriations—

Three Supreme Court decisions touching chemical affairs closely give tangibility to the wild whirl of developments in Washington during the past month. Definite signs of a rift in the relations between the President and Congress are perceived, but are extremely difficult to appraise. Admittedly herein lie changes in the political setup and in the legislative program full of all sorts of possibilities. The immediate result is a bad case of the jitters shared for different reasons by practically the whole of Washington. The feeling of uncertainty and insecurity is widespread and is beginning to reach out into financial and industrial circles.

"Open Formula Fertilizer Law"

With a sort of mental reservation the Supreme Court has unanimously upheld the fertilizer formula disclosure law of South Carolina, for a careful reading of the opinion suggests that, if the law is not "reasonably construed" along the lines suggested by the lower court, fertilizer manufacturers may have good cause to question its validity.

The Supreme Court's opinion, by Justice McReynolds, said:

> As the enactment has not been construed by the enforcing officers nor interpreted by the Supreme Court of the State, it is impossible to say what ultimately will be demanded of the complainant. The court below was of the opinion that, reasonably construed, the act would be satisfied if the tag upon a given container revealed the general average of the designated items which went into the storage or curing pile of fertilizer at the factory from which such container was filled. "These piles range from 100 tons up to 5,000 tons." This interpretation is, at least, permissible. So construed, we cannot say that the act is merely arbitrary, unreasonable, and beyond the police power of the State. Apparently it can be complied with without prohibitive expense.
>
> In response to the assertion that compliance with open-formula amendment would require complainants to reveal secret formulas and thus unlawfully deprive them of property, it is enough to refer to the Corn Products Refining Company case:—
>
> "The right of a manufacturer to maintain secrecy as to his compounds and processes must be held subject to the right of the State, in the exercise of its police power and its promotion of fair dealing, to require that the nature of the product be fairly set forth."
>
> And the same principle is broad enough to meet the further claim of right to sell products manufactured prior to the passage of the amended act of 1936.
>
> We find no material error. The challenged decree must be affirmed.

Philippine Oil Tax

In upholding a levy of three cents a pound on the first domestic processing of cocoanut oil, the Court held that the AAA decision which outlawed processing taxes on domestic products was not pertinent. AAA processing taxes, the Court said, were intended "to regulate a local situation, a matter wholly within the reserved powers of the states." The cocoanut tax is a true tax, the opinion continued, because exacted for the federal constitutional purpose of providing for the welfare of the people of the Philippine Islands.

The Revenue Act of 1934 imposed the processing tax on cocoanut oil wholly of Philippine production, providing receipts from it should be paid to the Philippine treasury, except that if the Philippine government provides a subsidy to cocoanut oil producers, payments should cease.

Justice Sutherland, who gave the court opinion, said "plainly the imposition of the tax in itself is a valid exercise of the taxing power of the Federal Government. It is purely an excise tax upon a manufacturing process for revenue purposes, and in no sense a regulation of the process itself."

Bar Use of "Sweet Gas"

In upholding the right of Texas to prohibit the use of "sweet" gas for carbon black manufacture, the Supreme Court made a decision of importance in the moot questions of state's rights and natural resources. The decision confirmed the validity of an order issued by the Texas Railroad Commission under the natural gas law, against the Henderson Company. The validity of this order had been upheld in the lower court. Justice Brandeis' decision was based on the premise that the statute did not violate the due process clause. Henderson maintained that the prohibition was unreasonably discriminatory against a manufacturer of carbon black from "sweet" gas, because owners of "sour" gas wells were thus favored.

The lower court found enough "sour" gas in reserve in the Panhandle to "fulfill the world's requirements for many years to come," and that there was available for use in carbon black plants "sufficient allotments under the orders of the railroad commission of 'sour' and casinghead gas to supply all the demands and needs of such plants, with an excess of 100,000,000 cubic feet of casinghead gas over and above the demand of the carbon black plants." This finding of fact was sustained by the higher court.

Watchful waiting is the order of the day on the Supreme Court issue, the Wagner Act, and the budget while the Neutrality Law is still being debated as to its effect. There is little doubt however that both houses of Congress are determined to take the profits out of war, and at the least the chemical industries can confidently expect the strictest control in event of any hostilities. Some of the shrewder chemical observers are beginning to wonder if the "national defense" plea has not been a bit overdone in the past.

March Chemical Imports

March imports of chemicals, drying oils, gums, waxes and related products aggregated $18,348,000 in value compared with imports of such materials valued at $16,700,000 during the preceding month, $13,000,000 in January, and $12,600,600 in March, 1936, preliminary statistics of the Department of Commerce show.

Fertilizer materials headed the list as usual with receipts recorded at 253,800 tons valued at $5,587,000 during March against imports of 168,460 tons valued at $3,639,600 in March, 1936—a 50% increase both in quantity and value. In this classification imports of Chilean nitrate increased from 62,115 tons to 97,980 tons in quantity and the value advanced from $1,231,700 to $1,819,000, statistics show.

COMING EVENTS

Refrigerating Machinery Association, Spring Meeting, Hot Springs, Va., May 12-13.

Air Conditioning Manufacturers' Association, Annual Meeting, Hot Springs, Va., May 14-15.

National Rayon Technical Conference, Washington, D. C., May 14-15.

American Gas Association, Production and Chemical Conference, N. Y. City, May 24-26.

National Association of Purchasing Agents, annual meeting, Hotel William Penn, Pittsburgh, May 24-27.

Flavoring Extract Manufacturers Association, Twenty-eighth Annual Convention, Congress Hotel, Chicago, May 24-26.

Third Dearborn Chemurgic Conference, Dearborn, Mich., May 25-27.

American Association of Cereal Chemists, annual meeting, Nicollet Hotel, Minneapolis, May 24-28.

American Institute of Chemical Engineers, semi-annual meeting, Toronto, Canada, May 26-28.

American Petroleum Institute, mid-year meeting, Colorado Springs, Colo., June 1-3.

N. Y. State Sewage Works Association, Utica, N. Y., June 4-5.

Pacific Northwest Section, American Water Works Association, Empress Hotel, Victoria, B. C., June 4-5.

American Gas Association, Industrial Gas Section, Chicago, June 8-9.

American Leather Chemists' Association, Royal York Hotel, Toronto, Canada, June 8-10.

American Water Works Association, annual convention, Hotel Statler, Buffalo, N. Y., June 7-11.

14th Colloid Symposium, Minneapolis, Minn., June 10-12.

Second World Petroleum Congress, Paris, Maison de la Chimie, June 14-19.

International Rubber Congress, Paris, France, June 28, 29 and 30.

American Society for Testing Materials, 40th Annual Meeting, Waldorf-Astoria, N. Y. City, June 28- July 2.

"Achema VIII," Plant exhibition, in connection with 50th General Meeting of Verein Deutscher Chemiker, Frankfurt, Germany, Sept., 1937.

American Chemical Society, 94th Meeting, Rochester, N. Y., Sept. 6-10.

National Safety Council, Kansas City, Mo., Oct. 11-15.

American Gas Association, annual meeting, Oct. 11-16.

American Society for Metals, Congress and Exposition, Atlantic City Auditorium, Atlantic City, Oct. 18-21.

N. P. V. & L. A., Convention, Cincinnati, Ohio, Oct. 27-29.

American Association of Textile Chemists & Colorists, annual meeting, Bellevue-Stratford Hotel, Philadelphia, Dec. 3-4.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 6-11.

LOCAL TO NEW YORK*

May 21st, A. I. C. annual meeting, N. Y. Chapter.

*** Chemists' Club unless otherwise noted.**

Personal

H. Gordon Mackelcan, vice-president for sales, and G. S. Hamilton, comptroller, Innis, Speiden & Co., sail in the *Europa*, May 16, for a six-weeks European trip. They will visit Germany, Czechoslovakia, Austria, France and the British Isles.

Léopold Maquet, Joseph Hubien and Alphonse Jadot, of the engineering staff of S. A. d'Ougre-Marihaye, Liége, Belgium, arrived in the *Queen Mary* April 5. They will make a six weeks' trip through the East and Midwest.

Charles P. Gulick, president of the National Oil Products Co., Harrison, N. J., has been made a director of the Harrison National Bank.

Dr. Gustav Egloff, Universal Oil Products, will sail June 2 in the *Normandie* to attend the Second World Petroleum Congress meeting in Paris. He will be away about a month.

A. E. Marshall, consulting chemical engineer and past president A. I. C. E., sailed with Mrs. Marshall in the *Aquitania* May 12 for Europe. They will visit France, England, Belgium, and Germany, returning about the first week in July.

Personnel

R. J. Flood, formerly with the Seagram Distillers Corporation, has been appointed sales manager for the Anti-Freeze division of the Commercial Solvents Corporation, New York, effective immediately.

James R. Harrington, formerly with the Titanium Division of National Lead Co., is now with Mathieson Alkali Works. He received his chemical engineering training at Washington University in St. Louis, and will cover the Metropolitan Area for Mathieson.

Don M. Welch, of Akron, has joined the staff of Continental Carbon as rubber chemist in the laboratories of its plant at Sunray, Texas. He graduated in chemistry at Ashland College, Ohio, and was four years assistant to the chief chemist of the Mansfield Rubber Tire Co.

William J. Lawrence, a director and a vice president of Hercules Powder, and general manager of its Paper Makers Chemical Division, has resigned from the organization, to devote his entire time to the many businesses in which he is interested in the Middle West and the South. This action concludes a service of twenty-six years in the manufacture and sale of papermaking chemicals. Management of the Paper Makers Chemical Division has been placed with P. B. Stull, a Hercules director, and formerly general manager of the company's Virginia Cellulose Department. The activities and organization of the Paper Makers Chemical Division will continue unchanged.

J. F. Warner, for many years with Pacific Mills, and well known in the textile industry, has joined Calco Chemical as vice president, and will make his headquarters at Bound Brook, N. J. Mr. Warner had early training with Standard Aniline Products and in the dye division of Grasselli Chemical Co.

More Honors for Baekeland

University of Edinburgh, has bestowed upon Dr. L. H. Baekeland an honorary degree of Doctor of Laws. This degree will be formally conferred on July 2nd. He was also recently elected a life member of the Royal Society of Arts, London. Last summer he was chosen as recipient for the Pioneer Cup of the Chemical Foundation and the Farm Chemurgic Council.

W. W. Gast, of du Pont, is chairman of arrangements for the National Convention of the National Association of Purchasing Agents, to be held in Pittsburgh, May 24-28. Attendance of about 2,000 members of the National Association is expected.

Mrs. Edwin Binney (Binney & Smith) of Old Greenwich, Conn., has given to Yale $2,500, increasing to $7,987 the June Binney Fund, named to honor her son of the class of 1921.

E. N. Monroe, president of the Monroe Chemical Co., Quincy, Ill., believes that youth faces today the greatest opportunity in the world's history and said so in no uncertain terms in an interview in the *Quincy Herald-Whig-Journal* published on April 6, the day before he celebrated his 82nd birthday.

Medal of the American Institute of Chemists, for outstanding service to the science of chemistry or the profession of chemist in America, will be awarded this year to Dr. James F. Norris, professor of organic chemistry, in charge of graduate students in chemistry, and director of the research laboratory in organic chemistry, at Massachusetts Institute of Technology, at the Institute's annual dinner, May 15 in New York.

Col. Walter Campbell Baker has been named chief of the Chemical Warfare Service of the Army with the rank of major general, succeeding Maj. Gen. Claude E. Brigham.

Obituaries

Dr. Allan F. Odell, 51, director of chemical research of the du Pont plant at Arlington, N. J., died on April 10 in Essex Fells, N. J. Dr. Odell had been with du Pont twenty years, the last seven in the plastics department. He played a big part in the development of shatter-proof glass. Born in Columbia, Tenn., and graduated from Vanderbilt, he became a research chemist for Charles Pfizer & Co. Before his association with du Pont he invented a synthetic process for tartaric acid. He was a member of the A. C. S., heading its New Jersey section at one time; the American Institute of Chemists, and other scientific bodies.

Raymond Marcus Keating, 50, second vice-president and secretary, Baugh & Sons Co., died April 3 in Baltimore of a heart attack.

Geo. G. Fries, Jr., 16, son of Geo. G. Fries, president, Geo. G. Fries & Co., died April 2 in Jacksonville, Fla., after a few days' illness.

Lewis E. Elwood, 74, president-general manager, Farmers Fertilizer Co., since 1917, died April 3 in Columbus, Ohio, of a pulmonary embolism, resulting from an infected leg injury sustained in an automobile accident.

Frank Morton Archer, Sr., 74, chairman and general manager of the Moxie Co., died April 8 in Brookline, Mass. During his forty years of management the company is reported to have sold more than $140,000,000 worth of Moxie.

Thos. W. Crosby, 76, South Alabama naval stores operator, died April 1 in Foley, Ala., following a paralytic stroke.

Dr. Leroy Wiley McCay, 79, retired chairman of the chemistry department of Princeton, died on April 13 in Princeton, N. J., after a long illness.

Dora Toch, 72, widow of Henry M. Toch, paint manufacturer, March 26, after an illness of five months.

Dr. Max Wallerstein, 63, chemist and founder of the Wallerstein Labs., died April 1. He was a member of the A. C. S., Chemists' Club, and a former president of the American Brewing Institute.

Alexander M. Fairlamb, 61, asst. treasurer, Air Reduction Co., died April 4 in Larchmont, following a heart attack. He had been associated with the company for nineteen years.

Joseph C. Neustaedter, 76, auditor and director, Church and Dwight Co., died suddenly on April 26 in East Orange, N. J. He had been connected with the company for 57 years.

Dr. William Waldemar Share, 78, chemical engineer and chairman of directors of the Meurer Steel Barrel Co., died on April 20 in Brooklyn.

Albert B. Alsop, 66, for some years associated with Virginia-Carolina Chemical, died after a brief illness April 15, in Richmond, Va. He retired several years ago.

Chemical Labor Troubles Quieting Down

Textile Dyers Fighting Out Disputes in Court—Wage Increases at Solvay, Niagara Sprayer, National Aniline—General Aniline Workers Vote Down C. I. O.—

No such turbulent labor problems as stirred up the Kanawaha Valley plants during March came up for solution during the past month. Even at that storm center of C. I. O. activity things quieted down. The dyeing trade of northern New Jersey, notably in Hoboken and in Paterson, has been torn by lawsuits and counter suits involving labor questions. International Dye & Print Works has been sued for $200,000 for libel in describing the activities of the Dyers' Local as "black-jacking and racketeering." Michael Santore, Lewis' organizer in the Jersey textile field, has haled Theo. Van Heek, president of the Hope Finishing Co. before the National Labor Relations Board charging a lockout. In the case of the Victory Dyeing & Finishing Co., the clause requiring arbitration of the case of discharged employees to be notified within 72 hours has come up as a new point in disputes of this sort.

In Detroit, Parke-Davis and in Providence, Rumford Chemical were both treated to sit-down strikes which apparently were symptoms of the local epidemic. In both cases only a small minority of the workers were involved and the point at issue was the recognition of the C. I. O. as sole bargaining agency.

Viscose came to agreement with the C. I. O. textile organization in line with the Chrysler settlement. The union is recognized agent for its own members, no closed shop is set up, no company union is to be organized, and a 10 per cent. raise increase granted. This affects 20,000 workers in the five plants of the country's largest rayon producer.

Wage increases have been made at Solvay's Hopewell plant of from 5 to 10 per cent. National Aniline at Buffalo and Niagara Sprayer at Middleport, N. Y., have both raised wages 10 per cent.

Employees at the General Aniline plant at Rensselaer, N. Y. voted down an "outside" union, 394 to 72 after a mass meeting which was addressed by two of their fellow workers. Charles Hacker favored a local plant council similar to that in practice at the New Jersey plant of the company, and Horace LaBier advocated C. I. O. affiliation. The A. F. L. took no part in the ceremonies. Ballots were distributed to all employees, except executives and foremen with the right to hire and fire, and the meeting, balloting and count were entirely in the hands of the men.

Monmouth Chemical Company's new address is 15-25 Whitehall Street, New York, N. Y. Telephone number, Bowling Green 9-0388, under the supervision of A. D. Stuek, same as in the past.

Chemical Employment

Employment in the chemical manufacturing industry increased 1.2% from February to March, 1937, total man-hours worked rose 1.0%, and total payrolls advanced 2.8%, according to the National Industrial Conference Board.

Average hourly earnings of wage earners in the chemical manufacturing industry in March were 68.6 cents, as compared with 67.5 cents in February, and 60.9 cents in March, 1936. In the 25 manufacturing industries for which figures are compiled each month by the Conference Board, average hourly earnings were 65.9 cents in March, 64.2 cents in February, and 61.1 cents in March a year ago.

Average weekly earnings in the chemical manufacturing industry amounted to $27.94 in March, 1937, as compared with $27.52 in February, a gain of 1.5%. These figures compare with average weekly earnings of $24.14 in March, 1936. In the 25 manufacturing industries reporting to the Conference Board, average weekly earnings were $27.49 in March, $26.68 in February, and $23.67 in March, 1936.

The average work week in the chemical manufacturing industry in March was 40.7 hours, which compared with an average of 40.8 in February, and 39.6 in March, 1936. In the 25 manufacturing industries as a whole the work week averaged 41.7 hours in March, 41.5 hours in February, and 38.7 hours in March, 1936.

Chemical Output Up in '35

Manufacturers of chemicals in the United States reported a 40 per cent. increase in value of products; a 23 per cent. increase in employment, and a 35 per cent. increase in wages, in 1935 compared with 1933, according to preliminary figures compiled by the Bureau of the Census from returns made in the biennial census of manufactures. The value of the products increased from $476,502,663 in 1933 to $668,697,448 in 1935; employment rose from an average of 53,190 in 1933 to 65,876 in 1935, and wages went up from $59,228,692 in 1933 to $80,480,665 in 1935.

Japanese Fertilizer Activities

The Japan Nitrogen Company is reported to have drawn up an elaborate expansion program which will necessitate an increase of 200,000,000 yen in its capitalization, according to reports from Tokyo. Practically the entire amount will be spent by a subsidiary company in Chosen which will virtually control the entire chemical industry of that area. Complete details of the plan are not available but they are understood to include several projects for the generation of hydroelectric power in Chosen, an elaborate plan for coal liquefaction, doubling of the chemical fertilizer output, and monopolization of the oils and fats industry of the peninsula.

The Association of Fertilizer Manufacturers which was organized in Japan in accordance with the Major Industry Control Law recently announced substantially higher prices for ammonium sulfate during the coming season. Consumers are opposing the new schedule, stating it to be exorbitant and unjustified.

Demonstration of Electrochemistry

Flaming ice, heat without fire, molten iron in five seconds, fire writing, and nitric acid from the air are among the seventeen startling and spectacular demonstrations in "Electric Fire," the new scientific presentation of The Franklin Institute, Philadelphia, designed to show the products of the electric furnace and demonstrate how electrochemistry is blazing trails to better living. Dr. Nicol H. Smith conducts the experiments which continue from May 7 to June 27.

Society Chemical Industry Elects

The American Section of the Society of Chemical Industry announces the election of the following officers for the year 1937-38. Chairman, James G. Vail; Vice Chairman, Wallace P. Cohoe; Honorary Secretary, Cyril S. Kimball; Honorary Treasurer, J. W. H. Randall.

The following new Committee members were elected to take the place of retiring members: W. W. Winship, P. K. Frolich, F. D. Snell, F. A. Lidbury, G. M. Norman.

H. O. Brumder was re-elected president of Pressed Steel Tank Co., Milwaukee, at the company's annual meeting held recently. Vice-pres. R. P. Diekelman was re-elected and also made treasurer. Herman Merker was re-elected vice-pres. and George G. Brumder was elected secretary.

Fred Hurst, Roxalin Flexible Lacquer representative, Elizabeth, N. J., has been assigned to the Chicago area. He is located at 5855 No. Mobile ave., Chicago. Howard Verrault is now representing the company in the upstate New York territory, making his headquarters in Rochester, N. Y.

H. H. Tucker, Milwaukee, industrial chemist, and Dr. John Koch of Marquette University were nominated for the chairmanship of the Milwaukee section of the American Chemical Society.

Heavy Chemicals

Industrial Chemical Demand Falls Off

General Uncertainty Makes Buyers Hesitant—Insecticide Sales Strong—Copper Sulfate Scarce—

A definite slackening in the general demand for industrial chemicals was reported in the past month. The uncertainties surrounding the labor situation, the sudden collapse in several of the raw commodity markets, plus the heavy purchasing of chemicals in the first quarter all combined to turn purchasing agents towards a more conservative buying viewpoint.

Yet in certain divisions exceptional tonnages of industrial chemicals continued to move out into consuming channels. Sulfuric producers were experiencing some difficulty in keeping up with shipping schedules and the alkali manufacturers report no decline in the volume of caustic going into rayon. The seasonal demand for agricultural insecticides and fungicides was highly satisfactory. A high rate of activity was reported in steel, glass, paper, and ceramics, but a downward trend was in evidence in certain divisions of the textile field. Automobile output was satisfactory with a production of about 500,000 units.

The sudden decline in the value of all the metals was reflected in sharply lower quotations for several of the important metallic salts and derivatives. Copper sulfate was reduced twice in the past month. The current carlot quotation is now $5.40, a loss of 60c per 100 lbs. The collapse in the tin market in London forced substantial reductions in tin crystals, the oxide, and anhydrous tetrachloride.

With an advance of 15c in acetate of lime, bringing the current price to $2.25, acetic producers rearranged their schedules at higher levels. The 28% material is now quoted at $2.53 in carloads and glacial at $8.70.

Despite the sharp break in copper sulfate spot stocks are difficult to obtain. Producers are booked solidly for the next 30 to 60 days. The lower price for copper sulfate merely reflects the decline in the metal and not any slackening in the demand for undue competition between the producers.

Michigan Chemical Co. of Saginaw with a plant at St. Louis, has organized a subsidiary to be known as the Michigan Salt Co. The new corporation will be a sales organization, with Donald H. Wilkinson at the head, and will handle distribution of the salt now manufactured by the chemical company.

C. Tennant Sons & Co., have moved their offices to 9 Rockefeller Plaza, New York: phone, Circle 6-2585.

New Wood Chemical Project

Northwood Chemical Co. has been organized to produce wood chemical products, including activated carbon, with capital of $250,000 to buy the plant of C. M. Christiansen & Co. at Phelps, Wisc. The project is to be actively headed by E. T. Olson, president and former general manager of the Cliffs-Dow Chemical Co. at Marquette. The company has been promoted by Olson, M. K. Reynolds, vice-president, A. O. Reynolds, secretary and treasurer, George W. Truxal, of Cleveland, formerly chemical sales manager of the Cleveland-Cliffs, Wayne Fish, Minneapolis, Dr. Donald F. Othmer, New York, J. C. Gannon, Marquette, and Morgan W. Jopling, New York.

The Christiansen company, whose idle plant Northwood will buy, owns large tracts of timber lands adjacent to Phelps and operates a large saw mill there. The new company plans immediate construction of a laboratory and office building near the site of the present plant.

To succeed Olson at Marquette, Cliffs-Dow have appointed R. W. Jenner.

New Sulfur Output

The Jefferson Lake Oil Co. will begin production of sulfur at Clemens Dome on the Pabst land several miles west of Freeport within the next few weeks. A gas line to the field is now being completed. Gas will be used as fuel for the boilers, five in number, of 600-horsepower each. A warehouse and office buildings have been completed and more than 30 wells drilled in quest of the yellow mineral. More than a hundred men have been employed in the preliminary work.

Production of bleaching earth was begun Mar. 6 by the Tennessee Bleaching Clay Corp. at their recently completed modern processing mill, Paris, Henry County, a section long famous for its high-grade pottery clays. This new industry, based largely on investigations by the Tennessee Division of Geology, will use clays of the Porters Creek (Tertiary) formation, a natural resource heretofore practically ignored by the clay-mining interests of the region. Production from the new mill will be confined, for the present, to natural bleaching earths particularly suited to petroleum oil refineries. Officials of the new organization are: Mr. J. K. Dick, president; Mr. Sam Kohn, vice-president; and Mr. C. E. Hastings, secretary-treasurer, all of Paris. An experienced operating engineer has been employed as superintendent.

Important Price Changes

ADVANCED	Apr. 30	Mar. 31
Acid acetic, 28%	$2.53	$2.25
Glacial	8.70	8.00
Glacial, U.S.P.	10.75	10.30
Acid tungstic, tech.	2.75	2.50
Calcium acetate	2.25	2.10
Lead nitrate	.11	.09
DECLINED		
Copper carbonate, 52-54%	$0.18	$0.19
Copper sulfate	5.40	6.00
Glycerine, dynamite	.27	.29½
Saponification	.20	.23
Soap lye	.18	.22
Sodium stannate	.36½	.41
Tin metal	.55½	.66
Crystals	.43½	.45½
Tetrachloride	.29½	.32

Witco Staff Changes

George T. Short has joined the New York office Sales Department of Wishnick-Tumpeer, Inc. Mr. Short comes to Witco with wide experience. A 1917 graduate of Vermont, where he completed the four year course in three years with a B.S. in chemistry, his first job was with the Armour Fertilizer Works. During the war he did research work on airplane dopes and plasticizers for the U. S. Government. Following this he was control chemist with Calco and in 1920 became assistant to the general manager of the Wilckes, Martin, Wilckes Company, Chemical Division; in 1925 the General Manager; the following year a Director and Vice-President till that company was merged with the Swann Corporation in 1930 and held that position until the latter firm became a part of the Monsanto Company in 1936.

Melville Vaughan, formerly chief chemist at the Witco owned Pioneer Asphalt plant in Lawrenceville, Ill., has now joined Witco's technical staff in the East, where expansion of the company's development and research laboratory facilities has been under way for several months. After graduating from Illinois in 1928, Mr. Vaughan began his career as tire compounder with the B. F. Goodrich Company. He joined Wishnick-Tumpeer in 1930 and since has been engaged in development work in Louisiana, Texas and Illinois. Working with Mr. Vaughan in organizing the new centralized laboratory, located at 251 Front st., New York, the old offices of Wishnick-Tumpeer, is E. M. Allen, who came to Witco late last year from the research laboratories of the Chemical Division of the Pittsburgh Plate Glass Co.

Lodi Sulphur and Chemical Co. to manufacture sulfur, insecticides, and fertilizers, is capitalized for $25,000 and will maintain headquarters in San Joaquin County, Calif.

Coal-Tar Chemicals

Cresylic Acid Up Sharply on Scarcity

Other Coal-Tar Items Hold to Steady Schedules—Dye Demand Drops for Summer—

Price stability again featured the markets for coal-tar chemicals. Leading producers report a satisfactory demand for nearly all items. The current contract prices for toluol, benzol, xylol, and solvent naphtha have been renewed for the second half of the year.

The acute shortage in cresylic remains unchanged and an 11c advance was made in the low boiling grade. There appears little likelihood of any change in the basic conditions in the market for this material for some time to come. In fact momentarily the situation may become more serious for the disinfectant producers are now seasonally heavier buyers and the demands from the synthetic resin producers are steadily increasing. In addition offerings of foreign material are light.

While no price advance has been made in phthalic anhydride, producers are booked to capacity and spot supplies are difficult to obtain. A similar situation exists in most of the phthalates.

The steady operations in steel at around 90% of capacity is reflected in heavy coke production, which in turn has brought about larger stocks of raw coal-tar chemical material for processing. This condition, however, has not caused any accumulation of finished coal-tar chemicals. Nevertheless the shut-downs in the Detroit automobile area in the past few months have helped to ease the former scarcity of most of the coal-tar solvents.

Crude naphthalene quotations were rather soft, a very decided turnabout from the condition that prevailed just a year ago. Refined prices are being very firmly maintained and a satisfactory volume is moving into merchandising channels.

The high rate of activity in most divisions of the textile field has resulted in a heavy demand for intermediates and dyes. Some slackening is now anticipated due to seasonal influences.

Expansion of the Silica Black Products Co., subsidiary of the Tierney Mining Co. now engaged in the experimental manufacture of silica black and other coal byproducts by a newly discovered process, is planned by Lewis C. Tierney, president. The company, with authorized capital of $50,000, already has an experimental unit for production of a coal-tar-diatomaceous earth compound in operation at Morgantown with a capacity of two retorts.

A. R. Maas Chemical Co., Los Angeles, is building a new steel and corrugated iron plant building, to cost $2,000.

Benzol and Sulfate Production

Accurate statistics on the recovery of by-products from coke-oven operations in 1936 are not yet available, according to the Bureau of Mines. The following preliminary estimates are obtained by assuming that the quantity of by-products recovered during 1936 bore the same relation to the known production of coke in 1936 as in 1935:

Tar, 586,000,000 gallons; gas, 707,000,000 cubic feet; crude light oil, 174,000,000 gallons.

The following estimates are based on the production of coke at by-product ovens known to recover these commodities, as reported monthly by the operators during 1936:

Benzol (crude and refined and motor benzol), 106,560,000 gallons; ammonia (sulfate equivalent of all forms), 709,485 net tons.

San Francisco Office, Carbon Sales Division, National Carbon Co., formerly at 599 Eighth St., has moved into the Adam Grant Building, 114 Sansome St. This office is under E. C. Friday, District Manager.

Lime-sulfur plant of Ansbacher-Alton Chemical Co. was destroyed by fire of unknown origin Mar. 24. Partially covered by insurance, the loss was estimated at $25,000 by Wallace Wagemaker, president of the corporation. Company plans to rebuild at once, but fire at peak of spring insecticide season will cut down this year's operations.

Williams Licenses Valid

C. K. Williams & Co., Easton, Pa., has been confirmed by the United States District Court, St. Louis, in its possession, of licenses to sell iron oxide and bentonite for the control of mud fluids in the drilling of oil and gas wells. Judge George H. Moore found for the Williams companies in a suit against the National Pigments and Chemical Company, applying in his findings and conclusions the Federal declaratory judgment act of June 14, 1934. The suit involved the terms of two licenses granting C. K. Williams & Co. and its subsidiaries the right to sell iron oxide and bentonite for use in well-drilling under United States patents No. 1,575,944 (Stroud) and 1,991,637 (Harth) owned by the National Pigments and Chemical Company. The National Company declared the licenses forfeited and attempted to cancel the contracts. C. K. Williams & Co. brought suit under the declaratory judgment act to have the contracts judicially interpreted.

Important Price Changes

ADVANCED	Apr. 30	Mar. 31
Acid cresylic, L.B.	$0.90	$0.79
Resin	.10¾	.09½
DECLINED		
Naphthalene, crude	$2.60	$2.55

Chinese Market for Rubber Specialties

Sixty tons of rubber accelerators were consumed in the Shanghai district last year, with anti-oxidants and similar products 15 tons and rubber colors 5 tons. Upward of thirty rubber plants chiefly manufacturing overshoes, of which 20 are located in the International Settlement, are functioning in the Shanghai area. A local firm, largest in the industry, for the last two years has been manufacturing rubber motor car casings and tubes. For this purpose they are using American rubber chemicals exclusively, and during 1936 imported for the first time anti-flex cracking and sun cracking rubber chemicals. American rubber accelerators are extensively used by the rubber industry, while other chemicals are mainly secured from Germany, Japan and local sources. Chinese Maritime Customs Returns of Trade do not separately classify rubber chemicals but exports to China from the United States during 1936 of rubber compounding agents of coal-tar origin (accelerators, retarders, etc.) amounted to 41,708 pounds.

French Potash Sales Up

Total output of French potash mines during 1936 reached 2,073,000 metric tons, a slight increase over 1,984,000 tons in 1935, but far behind the record 3,136,000 tons of 1930. Last year State Mines produced 1,411,000 tons, against 1,358,000 tons in 1935; the Kali Ste. Thérèse mines, 662,000 tons, against 625,000 tons in the previous year. In K_2O, total sales of French potash during 1936 increased to 386,000 tons, compared with 347,000 tons in 1935 and 494,000 tons for 1929. Domestic sales improved to 220,000 tons of K_2O, as against 155,000 tons in 1935, and nearly equalling the maximum 230,000 tons in 1929. In spite of increased world consumption sales of French potash abroad declined to 166,000 tons, against 192,000 tons in 1935 and 264,000 tons in 1929, due to the fact that the French mines are obliged to give priority to the domestic market. The deficiency in the French export quota was made up by other members of the International Cartel, principally Germany, which was also obliged to supply the shortage from the Spanish mines.

Fine Chemicals Record Price Advances

Glycerine, Mercury and Bismuth All Fall Short of Buyer's Needs—Alcohol Firms Markedly—

The acute shortage in glycerine is now over and producers are making shipments and actively soliciting business. Prices are sharply lower, the reduction in the C. P. grade amounting to 2½c and the current quotation is 27c for drums. A little reselling on the part of a few second-hands was reported, but their stocks were extremely small and appear to have been worked off the market. The other grades have been reduced as follows:—dynamite, 2½c; saponification, 3c; and soaplye, 4c per lb.

The firm price positions of mercury and bismuth are reflected in the steady quotations for their respective salts. Agar was advanced 10c per lb. near the close of the month. A similar price rise was noted in phenolphthalein. Cream of tartar was raised 1c in the third week of the month and is currently quoted at 16¾c in 10,000 lb. lots.

The steady rise in the price of corn during April placed grain alcohol in a very firm position and producers report an excellent demand for pure material and the special formulas.

Fine chemical producers report that the April volume was quite satisfactory. While the usual seasonal let-down in the call for many items has taken place a better demand for tartaric and citric acids is reported. An exceptional amount of interest is being shown in cod liver oil, both the U.S.P. and poultry grades.

Important Price Changes

ADVANCED	Apr. 30	Mar. 31
Acid tungstic, C.P.	$3.00	$2.75
Agar agar, No. 1	1.15	1.05
Alcohol, benzyl	.70	.65
Corn syrup, 42°	4.26	3.91
43°	4.31	3.96
Cream of tartar	.16¾	.15¾
Phenolphthalein	.85	.75
DECLINED		
Glycerine, C.P.	$0.27	$0.29½

Want Lighter 5-E Drum

Manufacturing Chemists Association has requested the Bureau of Explosives to change the specifications for the 5-E steel drum to permit the use of 20-gauge for 18-gauge steel. The bureau will hold a hearing on the petition in New York, May 19.

The 5-E drum is a non-returnable container. The Association has made extensive tests on drums of 20-gauge steel and concluded that these will be completely satisfactory.

The Worcester Chemical Distributors Corp. to engage in the sale of industrial and fine chemicals, with headquarters at 1 Coes Square, Worcester, Mass., has been organized by president, Frank W. Hatch; vice-president, Harry G. Christenson, and secretary-treasurer, Edgar J. Potvin. Hatch and Potvin have been with Brewer & Co.

Option on property in Utah, with indications of a large surface sulfur deposit, has been taken by the Freeport Sulphur Co. The property, known as the Sulphurdale mine, is located in Beaver County about 200 miles southwest of Salt Lake City.

Porcalin Flexible Coatings, Inc., Nutley, N. J., was directed by Vice Chancellor Bigelow to show cause why it should not be required to change its corporate name. The order was signed on application of Roxalin Flexible Lacquer Co., Inc., of Elizabeth, which charged similarity of names causes confusion in the trade.

The J. P. Baker Co. has leased space in Tribune Tower for their Chicago office.

Walter J. Trautman has sold his stock in the Allied Industrial Alcohol Corp. and retired from the presidency. He plans to return to his old home in New Orleans, but business plans for the future are undecided.

Oliver Resigns Chemical Construction

Thomas C. Oliver, for the past 23 years an officer of Chemical Construction Corp., has resigned. With Peter Gilchrist and the late I. Heckenbleichner, Mr. Oliver was a founder of the Chemical Construction in 1914 at Charlotte, N. C. In 1930 Chemical Construction was purchased by American Cyanamid Co., and has since been operated by them as a subsidiary, Mr. Oliver remaining as vice president. Mr. Oliver intends to devote his time to Charlotte Chemical Laboratories, Inc., Charlotte, N. C., and other technical projects in which he is financially interested. His address is 3448—81st st., Jackson Heights, New York City.

Fire Destroys Merck Warehouse

Fire destroyed the Montreal warehouse of Merck Company, Ltd., April 5, causing damage estimated at $120,000 and, for a time, menacing century-old Notre Dame Church housing priceless art works and religious relics.

Chemurgic Law Proposed

Research to solve problems of growing and utilization of Southern agricultural products other than forest products would be established by bill (S. 2140) introduced by Senator Bilbo, of Mississippi. The laboratory would make experiments on cotton and its by-products, cottonseed, hulls, lint and linters, cotton stalks, rice straw, rice hulls, tung nuts, tung hulls, sugarcane bagasse, palmetto fiber, and similar products, and particularly to the collection, harvesting, preservation, and industrial utilization of whole cotton as a raw material for the manufacture of cellulose, with a particular view to the development of wider uses of Southern crops by industry.

The Department of Agriculture would administer the act, and an appropriation of $1,000,000 would be authorized for the first fiscal year following the passage of the bill.

Bentonite plant of the Wyodak Chemical Co., at Jerome, Utah, was destroyed by fire. The plant, which has been operated since its erection in 1928, was soon to have been torn down. Equipment was to have been moved to a new location.

Solvents Advance

Important Price Changes

ADVANCED	Apr. 30	Mar. 31
None.		
DECLINED		
Acetone, drs.	$0.06½	$0.07½
Tks.	.05½	.06½
Methanol, denat. grade:		
Drs.	.46	.53
Tks.	.40	.48

The outstanding development in the market for solvents last month was a 1c reduction in acetone quotations. Competition again became acute after a month or so of generally quiet conditions. The market is finding difficulty in absorbing the additional quantities of this material that are now being offered.

Firm prices prevailed throughout the 30-day period in the petroleum solvents. Improved demand, following the resumption of heavier manufacturing schedules in the automotive and rubber fields, plus the belief that higher crude oil prices are almost a certainty in the near future, were the most important influences on the market.

A sharp reduction, amounting to 8c, was made last month in the denaturing grade of methanol and producers reported a sharp increase in deliveries following the announcement of the decrease.

Pigment Prices Higher on Metal Base

Quotations Reflect Advances in the Primary Metal Markets—Casein Drops Lower—Paint Sales Good—

Reactions in the metal markets were responsible for most of the price changes in the raw paint material field last month. All of the lead pigments were lower and a 1c decline was reported in chrome yellow. The schedule for zinc oxide was rearranged at lower levels.

It is more clearly realized now that the sweeping price rises in the metal markets over the first quarter of the year were caused primarily by wild speculation abroad and centered in London. While domestic recovery in the United States would naturally have brought about a better demand for the metals and consequently a gradual betterment in quotations, nevertheless the advances would not have been as precipitous except for the feverish speculation and accumulation of stocks in Europe. The bubble has largely burst now and more orderly price conditions are now anticipated, unless, of course, the European war scare again becomes "front-page news."

The steady decline of the past few months in casein continued last month. With domestic stocks increasing seasonally the outlook for firmer prices in the immediate future is none too bright. Certain of the varnish gums were sharply higher. Cable prices from abroad indicate that replacement costs are likely to be higher and importers here are not especially anxious to unload spot stocks.

Despite the 2½c break in glycerine quotations last month the price for ester gum remained unchanged as the month closed. The producers of ester gums have been forced to absorb at least a part of the high prices which have prevailed for glycerine for several months and whether or not a reduction in the gum is made seems to depend on the further trend in the glycerine market.

Suppliers of raw paint materials generally report that the tonnages moved into the hands of the paint manufacturers last month was highly satisfactory. The paint producers are banking heavily on sales being much greater than in the second and third quarters of 1936 and feel that higher prices for the finished goods wil' not affect sales adversely.

Important Price Changes

ADVANCED	Apr. 30	Mar. 31
None.		
DECLINED		
Casein, 20-30	$0.14	$0.17
80-100	.14½	.17½
Chrome yellow	.14½	.15½
Lead sulfate, basic	.07	.08¾
Litharge	.07½	.08½
Orange mineral	.11½	.12½
Red lead	.08½	.0945
White lead	.07½	.09
Zinc oxide	.06	.06¼

John C. Hathorn, Jr., recently manager of the Cleveland office of Fred L. Lavanburg Co., is now manager for C. E. Hoover Co., New York. Mr. Hathorn's post as Cleveland manager of Lavanburg has been filled by Selden G. Hait, Jr., former assistant manager of the company's Philadelphia office.

Miner-Edgar Plant Sold

Sale of the personal property of the Miner-Edgar Chemical corporation, also known as the Consolidated Chemical Corporation, at Sutton, W. Va., to the Kulka Iron and Metal Co., Alliance, O., for $41,500 has been confirmed by Judge McClintic, of the district federal court. There is litigation as to the property, whether Miner-Edgar or Consolidated Corporation owns it.

Ground Mica Gets Rules

Trade practice rules for the Wet Ground Mica Industry have been promulgated by the Federal Trade Commission under its trade practice conference procedure. The industry membership embraces all engaged in the production, manufacture and distribution of wet ground mica, used principally in the rubber, wall paper, coated paper and paint industries. The invested capital of the industry is estimated at about $1,000,000, and the annual sales at about $300,000.

At a trade practice conference held under the auspices of the Commission in Washington, Jan. 29, proposed trade practice rules were adopted and submitted to the Commission for its approval.

Dye and Tanstuffs Reflect Spring Closing

Prices Irregular and Sales Show Premature Summer Slackness—

Movement of chemicals and chemical specialties into the textile and tanning trades was generally satisfactory in April but some slowing down of operations in certain sections of the country was reported at the close of the month. Two reasons have been assigned. Firstly, labor troubles suddenly developed in the New England shoe centers when CIO organizers attempted to extend the sphere of their influence into that field, and secondly, the usual seasonal let-down in textiles has begun to appear somewhat early this year. The rayon manufacturers, however, are unlikely to curtail production for several months for they have enough business on their books to warrant pushing production to the fullest capacity. The situation in cotton, wool, and silk is not so promising. The high rate of activity for the past six months is beginning to be felt and a mild accumulation of finished stocks is reported.

The most important price change in the past month was in the corn derivatives. Corn dextrin was advanced to $4.70 and British Gum to $5.05, an advance of 35c in both cases. A 35c increase was also introduced in starch prices and in tanners' corn sugar. A 1c increase was made in Gambier Singapore cubes and the prevailing market is now 10½c.

Buying of natural tanstuffs was very irregular last month. Consumers continued to hold to a "hand to mouth" purchasing policy. A slight decline was reported for egg albumen. The decline in zinc prices forced a downward revision in zinc dust quotations and producers near the close of the month were asking 8.60c to 9¼c, according to quantity. Solid and clarified Quebracho were advanced ⅛c early in the month and a similar increase was noted in Wattle bark extract.

Important Price Changes

ADVANCED	Apr. 30	Mar. 31
Corn sugar, tanners	$4.24	$3.89
Chestnut extract, 25%, tks.	.02125	.01625
Dextrin, corn	4.70	4.45
British gum	5.05	4.70
Egg yolk	.56	.55
Gambier Singapore cubes	.10½	.09½
Myrobalans J1	27.50	26.50
Starch, pearl	4.23	3.88
Powdered	4.33	3.98
Wattle bark extract, 60°	.04⅛	.03⅝
DECLINED		
Albumen, egg	$0.76	$0.77
Zinc dust	.0860	.094

The current level for corn derivatives is of more than passing interest. The level of corn prices was at the highest point last month in over 10 years and the 35c advance was the greatest single increase for these items in nearly a decade. Corn prices in Chicago reacted sharply on May 1st and a downward revision in quotations on the derivatives are now expected by consumers.

Reports from the New England area indicate a seasonal let-down in shoe production even in those sections still unaffected by strike influences. This has naturally slowed down operations in the tanneries in that section. Woolen plants are busy. Cotton producers are also active, although signs of a decline now are in evidence. Comparisons with last year, however, are extremely favorable, due, of course, to the fact that at this time a year ago this section was just recovering from flood conditions.

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CHEMICAL

The Photographic Record

Chemical containers for the ladies—three of the snappy models in synthetic fiber costumes at the du Pont Exhibition in New York last month.

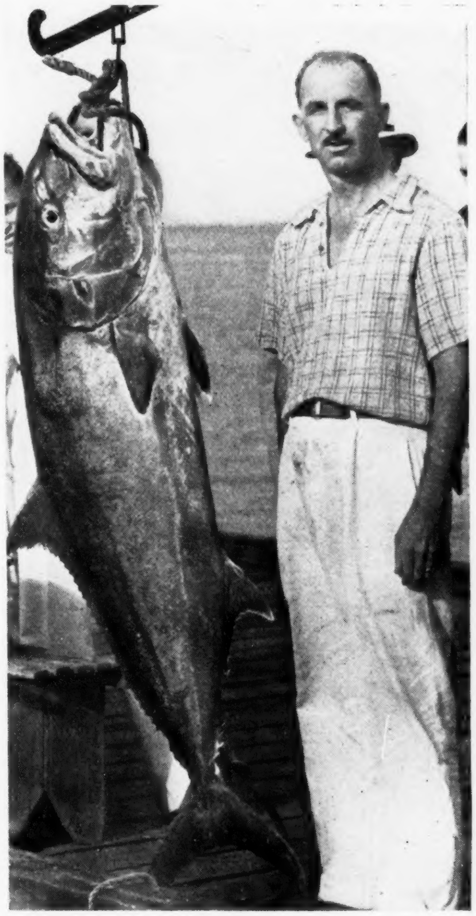
Charles H. Stone who has consolidated his ten year old textile specialty business with American Cyanamid.

Benjamin S. Mechling who with his brother has merged the Mechling silicates and insecticide business with General Chemical.

At 295 Madison Avenue, New York City, Wishnick-Tumpeer has moved into ultra modern quarters—the president's office and the reception room.

NEWS REEL

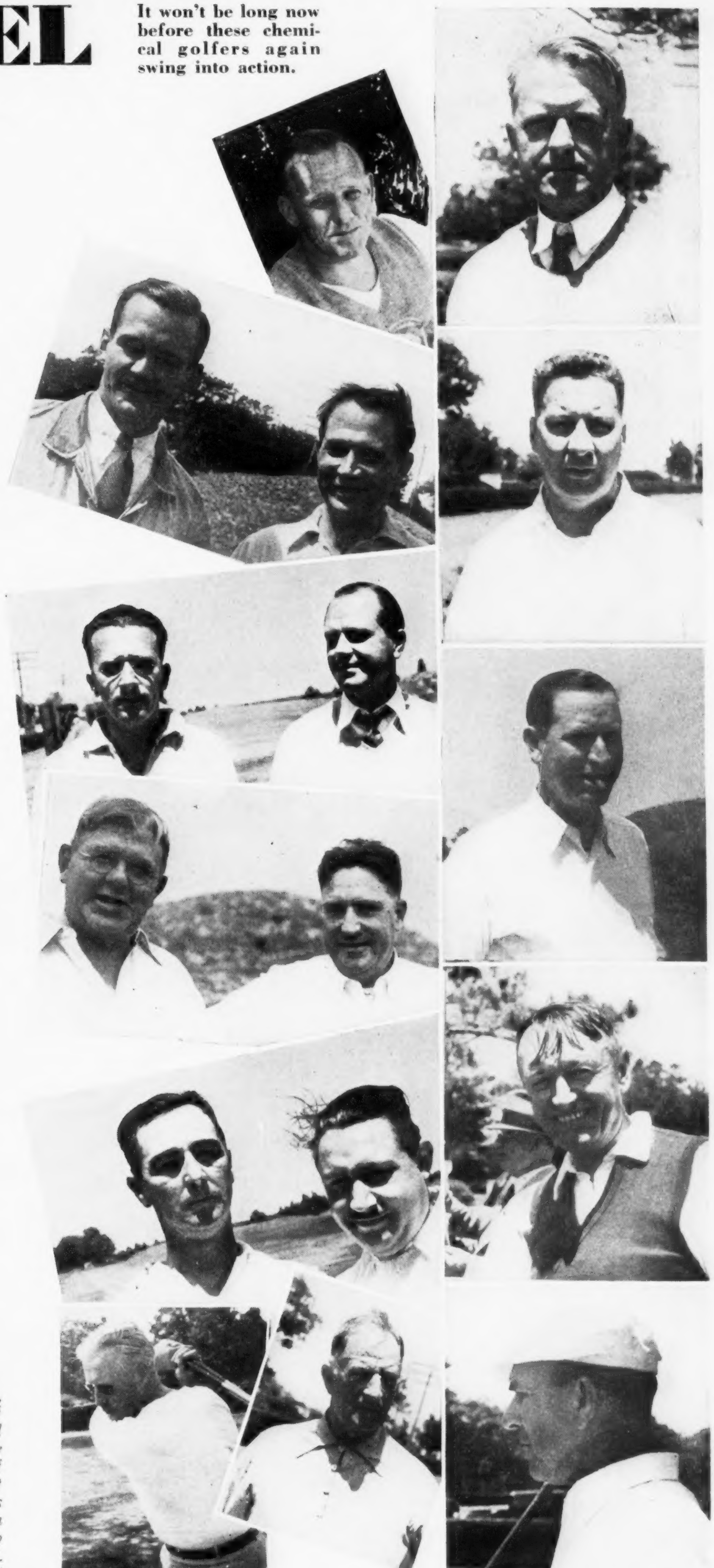
of Our Chemical Activities



Harvey M. Harker broke by eleven pounds a twenty year world's record for amberjack when he landed this 106 pounder—witnesses L. A. Watt, C. W. Merrell, P. E. Tillman, and B. F. Ascher.

James Kendall, formerly of Columbia and N. Y. U., now professor of chemistry at Edinburgh, has been paying a flying trip to the A. C. S. meeting at Chapel Hill.

It won't be long now before these chemical golfers again swing into action.

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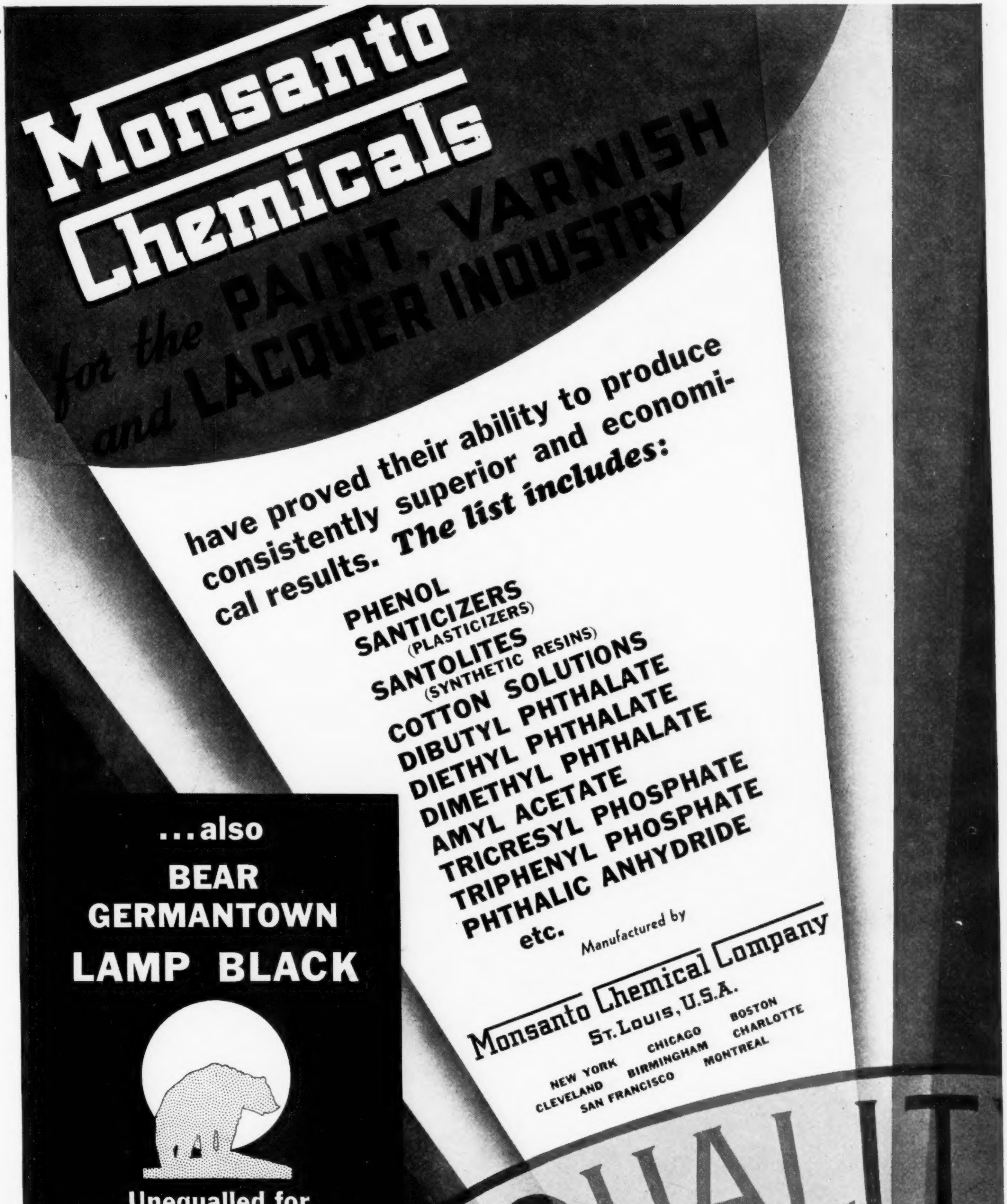
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have proved their ability to produce consistently superior and economical results. The list includes:
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SANTOLITES (SYNTHETIC RESINS)
COTTON SOLUTIONS
DIBUTYL PHTHALATE
DIETHYL PHTHALATE
DIMETHYL PHTHALATE
AMYL ACETATE
TRICRESYL PHOSPHATE
TRIPHENYL PHOSPHATE
PHTHALIC ANHYDRIDE
etc.
Manufactured by
Monsanto Chemical Company
St. Louis, U.S.A.
NEW YORK CHICAGO BOSTON
CLEVELAND BIRMINGHAM CHARLOTTE
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Unequalled for Purity and Permanence
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Fertilizer Sales Making New Records

Price Changes Almost Confined to Natural Materials—Superphosphate Oversold in Baltimore—

Despite the fact that the fertilizer season is from one to two weeks late the volume of shipments to date has been extremely encouraging. Top-dressing demand has proven unexpectedly better than anticipated earlier in the season. So far the price situation has been quite favorable and price-cutting and severe competition has only broken out in but very few localities.

Suppliers of raw fertilizer materials report heavy tonnages of nitrate of soda, sulfate of ammonia, and cyanamid are being moved. One interesting development is the mild shortage of superphosfate in the Baltimore area and this is attributed to the difficulty of getting sulfuric acid shipments promptly. Conflicting reports are heard on the sulfate of ammonia situation. Supplies are said to be difficult to obtain in certain sections, while in others some re-selling on the part of second-hands is reported. Potash suppliers are making additional shipments in many sections to take care of the unexpected demand for top-dressing mixtures.

The organic ammoniates, with the exception of tankage, remain firm in price and higher quotations were placed in effect for blood and nitrogenous material. Offerings were extremely light. Higher prices prevail for fish scrap and fish meal.

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Blood, dried, Chicago	$3.95	$3.75
Imported	3.95	3.90
Castor pomace	25.00	23.00
Fish scrap, Balt.	4.25	3.75
Nitrogenous material:		
Imported	3.55	nominal
Eastern points	4.25	3.90
Midwest	3.75	3.40
Superphosphate, 16%	8.50	8.25
DECLINED		
Blood, dried, N. Y.	$4.00	$4.10
Linseed meal	37.00	38.00
Tankage, ground, N. Y.	3.90	4.00
Unground, N. Y.	3.90	4.00

The Secretary of Agriculture is authorized to initiate research and investigations for the development of suitable processes for the manufacture of a low-cost, efficient fertilizer from phosphate rock under the terms of a joint resolution (S. J. Res. 125) introduced by Senator James P. Pope, of Idaho. An appropriation of $150,000 is authorized for the project, and the secretary is directed to co-operate with the States wherever practicable in making the investigations.

Mid-West Use of Fertilizer Grows

Indiana fertilizer sales totaled 245,537 tons in 1936, the largest volume ever recorded and an increase of 29 per cent. over 1935. Complete mixed goods last year accounted for 174,478 tons, or 73 per cent. of total tonnage. By far the most important grade continues to be 2-12-6, with sales of 107,658 tons in 1936, or 62 per cent. of all mixed goods, and 39 per cent. greater than in 1935.

	1935	1936
Nitrogenous Materials	2,096	1,876
Potash Salts	1,319	2,149
Superphosphate	19,628	25,865
Phosphate and Potash Mixtures	22,207	31,091
Miscellaneous	16,403	10,078
Complete Mixed Goods	128,414	174,478
Total Spring Sales	86,049	107,253
Total Fall Sales	104,018	138,284
Total Sales	190,067	245,537

The C & D Products Co. make fertilizer from the residue stacked up at the former Iliff-Bruff Chemical Co. plant at Hoopeston, Ill. M. Perry, formerly of Chicago, is in charge.

Planet Export Co., New York, is exclusive representative for the United States of N. V. Vereenigde Oliefabrieken, v/n H. Spits & Zn. & H. de Haan & Zn., oil and fatty acids, Rotterdam, Holland.

Federal Trade Commission has dismissed its complaint against Chilean Nitrate Sales Corp. and the Chilean Nitrate Educational Bureau, Inc., a subsidiary. Complaint was dismissed upon execution of a stipulation with the Commission by the respondent corporations, in which they agreed not to exhibit or circulate a motion picture entitled "Minor elements and natural salts in plant nutrition," or a pamphlet entitled "Vital Impurities, the fascinating story of Chilean natural nitrate, the only nitrogen that comes from the ground."

A $2,000,000 mortgage has been filed in Maury, Tenn., County Register by Armour Fertilizer Works, Inc., a new corporation organized to take over the phosphate holdings of the Armour interests. An old mortgage of $10,000,000, made in 1935, covering many of the Armour properties has been released.

G. M. Willetts, former superintendent of the V-C plant at Selma, N. C., has recently been made manager of the Reliance Fertilizer Co., a new fertilizer manufacturing plant at Whiteville, N. C. Ellis Mears is president.

Oils Slide Down in Commodity Decline

Lack of Buying Interest Emphasizes the Lower Prices on Many Raw Materials—Waxes Weak and Dull—

In sympathy with the generally lower prices for raw commodities the oils and fats, with but few exceptions, moved downward in light April trading. Copra in Manila was again quoted lower with the result that cocoanut oil was again weak carrying several of the competing oils with it. Babassu, palm, and palm kernel were offered for shipment at figures below those prevailing a month ago. An easier tone in foreign and domestic markets for Chinawood oil was reported. Buying was in relatively small quantities. Some shading in corn oil prices was noted and most of the animal oils and fats were sold at prices under those reported in the April market report.

Linseed prices moved upward last month. Rapeseed was strong and sales at 92c were made near the close of the period under review. The schedules for the various refined fish oils were generally maintained at unchanged levels but a slightly easier tone was noted in crude menhaden. Lower prices prevailed for cottonseed

Trading in waxes was light during the month. Higher prices were placed in effect for Bayberry, but few sales were reported at the 17c-17½c level. Quotations on Brazilian and Chilean Beeswax were raised to 32c and refined yellow was advanced to 35c-39c. A very quiet market for Carnauba prevailed and prices were steady and unchanged.

Important Price Changes

	Apr. 30	Mar. 31
ADVANCED		
Oils		
Linseed, raw, tks.	$0.107	$0.101
Oiticica, bbls.	.11¾	.11½
Perilla, drums	.11¾	.11½
Rapeseed, denatured	.92	.89
Waxes		
Bayberry	.17	.16½
Beeswax, Brazil, Chilean	.32	.31
Miscellaneous		
Pyrethrum extract, 2.4%	4.25	4.15
3.6%	6.37	6.10
DECLINED		
Oils		
Chinawood, tanks	$0.138	$0.147
Coconut, tanks	.07½	.08½
Corn, crude, tanks	.10	.10⅛
Lard oil, edible	.16	.16¼
Oleo, No. 1	.12¾	.13⅜
No. 2	.12¼	.12⅞
Peanut, tanks	.10	.10⅛
Stearine, oleo	.09¾	.10¼
Waxes		
Japan	.10	.10¼

Advancing prices were reported in the pyrethrum market in Japan. As a result producers here of both the extract and the powder were forced to increase their prices substantially. Some buying of '37 Japanese crop took place at the sharply higher prices, but in the main buyers are holding aloof hoping that a reaction will take place.

March Quarter Sets New Records

Reports of Carbide, Monsanto, du Pont, Atlas, Catalin and Mathieson Show Better Sales and Profits—

Net profit of Union Carbide in the 1st quarter set a new high record and shows net profit of $9,947,712 after interest, depreciation, federal income taxes, etc. This was equivalent to $1.10 a share on 9,000,743 no-par shares of stock. No mention was made of federal surtax on undistributed profits.

This compares with $7,502,393 or 83 cents a share in March quarter of previous year.

President Ricks emphasized at the recent annual meeting Carbide's advance into new fields, saying that if sales last year had been confined to only the same products sold in 1919, its 1936 sales would have been less than in 1919. In 1936, only 42% of net came from products made in 1919 while 58% came from products developed since then. Practically all of these new products have been developed by the research staff of the company.

Gains in earnings in recent years have been in the face of steady wage advances. Wages were increased 10% in August, 1933, and 11% in April, 1934. Between December, 1935, and April, 1936, upward adjustments ranging from 7½% to 10% were made and again in November, 1936, an 8% advance was made. In March, 1937, further upward adjustments for overtime over 8 hours daily or 40 hours weekly were made.

The company has a total of 56,000 stockholders of which 24,000 were women; 162 investment trusts and 369 brokerage holders. Of the total 48,000 or 85% held 100 shares or less and 6,143 held over 100 but less than 500 shares.

Monsanto Earns $1.20 Per Share

Monsanto and subsidiaries report for quarter ended March 31, 1937, net profit of $1,333,854 after depreciation, federal income taxes, estimated surtax on undistributed earnings, subsidiary preferred dividends and minority interest, equivalent to $1.20 a share (par $10) on 1,114,408 shares of capital stock. In March quarter of 1936 net profit was $1,032,852 after above deductions, but before any provision for surtax on undistributed profits, equal to $1.03 a share on 999,123 shares.

Consolidated income account for quarter ended March 31, 1937, follows: Gross profit $2,831,583; selling expenses, etc., $776,898; research expenses $270,720; operating profit $1,783,965; other income $108,335; total income $1,892,300; income charges $126,649; normal federal income taxes $325,043; federal surtax on undistributed profits $72,000; minority interest $14,414; preferred dividends of British subsidiary $20,340; net income $1,333,854.

Du Pont Sales Offset Wages

Preliminary report of du Pont states net profit for the three months ended March 31 at approximately $1.34 a share on 11,049,070 shares of common stock, against $1.21 a share in the 1936 first quarter.

In the initial three months of 1937, General Motors paid only 25 cents a share, against 50 cents a share last year, so that du Pont's income from its G. M. investment was only about 22 cents a share on its own stock, against 45 cents in the 1936 period.

On this basis, du Pont's earnings from chemical operations in the first 1937 quarter were apparently the largest for any three months in its history, equaling roughly $1.11 a share, against about 76 cents a share from chemical operations in the 1936 first quarter.

Volume of business has continued to gain during April, indicating further gains in profits in the June quarter. Widespread wage advances throughout the chemical industry, averaging around 10%, may perhaps be reflected in income accounts in the second quarter. However, gains in volume are such that larger dollar sales will more than absorb these higher operating costs.

Tennessee Corp.

Report of Tennessee Corp. and subsidiaries (fertilizer, sulphuric acid and copper) for year ended December 31, 1936, shows net profit of $353,298 after depreciation, interest, federal income taxes, and minority interest, equal to 41 cents a share on 853,696 shares (par $5) of capital stock, excluding 4,200 shares held by company.

This compares with net profit in 1935, of $186,104, equal to 21 cents a share.

Current assets as of December 31, 1936, including $400,612 cash and United States Government securities, amounted to $4,440,085 and current liabilities were $1,106,578, compared with cash and United States Government securities of $1,090,321, current assets of $4,850,303 and current liabilities of $933,255 at end of preceding year.

Ore reserves as of December 31, 1936, were estimated to be 9,177,305 tons, including the reserves added from the Ducktown Chemical & Iron Co. properties acquired by Tennessee Corp. late in 1936. Company also purchased late last year a small dry-mixing fertilizer plant in Tuscaloosa, Alabama. Subsidiaries of Tennessee Corp. will supply the necessary superphosphate required for operating the new plant.

Climax Shows Increased Earnings

Climax Molybdenum Co. will show earnings approaching $3 a share for 1937, it has been estimated. Net income in 1936, exclusive of depletion of discovered increment, totaled $5,206,111, equivalent to $2.06 a share. Earnings in 1935 equaled $1.27 a share.

Texas Gulf Sulphur

Texas Gulf Sulphur, reports for quarter ended March 31, net income of $2,100,050 after depreciation, amortization, federal income taxes, etc., equivalent to 54 cents a share on 3,840,000 no-par shares of capital stock. This compares with $2,149,018 or 56 cents a share in March quarter of previous year.

Abbott Laboratories

First quarter dividend of 40 cents a share plus 10 cents a share extra was earned in January-February by Abbott Laboratories, while March, which was the biggest month in the company's history, yielded about two-fifths of the indicated three months' profits. This showing is equal to about 80 cents a share on the 640,000 outstanding shares of stock and contrasts with indicated earnings in first 1936 quarter of about $375,000, or about 58 cents a share on the same basis and to about 62 cents a share on the 600,000 shares then outstanding.

Shawinigan Gross Higher

Shawinigan Water & Power Co. reports for quarter ended March 31, profit of $1,116,600 after expenses, ordinary taxes, fixed charges, etc., but before depreciation and income taxes, comparing with $781,035 in March quarter of 1936. Gross revenues for period were $3,677,092 against $3,290,847.

Catalin Profits Greater

Catalin Corp. reports for quarter ended March 31, profit of $85,012 after depreciation, etc., but before federal income taxes, comparing with $82,159 in previous year.

70c Share for Corn Products

Corn Products and subsidiary sales company report for quarter ended March 31, subject to audit and year-end adjustments, shows net profit of $2,205,500 after depreciation, federal and state income taxes, etc., equivalent after dividend requirements on 7% preferred stock, to 70 cents a share on 2,530,000 shares (par $25) of common stock. This compares with $2,799,990, or 93 cents a share on common stock, in March quarter of previous year.

P. & G. Makes New Record

Procter & Gamble earnings in the March quarter reached a new high record, making net profit of $8,198,490 after depreciation, federal income taxes, etc., and after provision of $600,000 for possible federal surtax on undistributed earnings and excess profits tax. This profit is equivalent after dividend requirements on 8% and 5% preferred stocks to $1.26 a share on 6,325,087 shares of no-par common stock.

I. C. I. Raises Surplus £26,402

Imperial Chemical Industries Ltd. set a new high record for profits in 1936 according to statement of gross income of £9,049,422. The net income after providing £1,000,000 (same) for central obsolescence and depreciation fund and £846,093 (against £645,891) for income tax, amounts to £7,203,329. This compares with a net balance of £6,706,539 for 1935, or an increase of £496,790. With the balance brought forward of £638,740 (against £608,451), the total is £7,842,069, an advance of £527,079. After providing £1,591,014 for the dividend on the preference stock and £1,229,973, equivalent to 2½ per cent. interim dividend on the ordinary stock, the directors have appropriated £1,500,000 (against £1,000,000) to general reserve and £150,000 (same) for the workers' pension fund.

The directors recommend a final dividend on the £49,198,900 ordinary stock of 5½ per cent. actual, making 8 per cent. for the year, less tax at the standard rate for 1937-38 (reduced by relief in respect of Dominion income-tax at 3½d. in the £1). The distribution is at the same rate as for 1935. The dividends will absorb a total of £5,526,927 and leave a balance of £665,142 to be carried forward, an increase of £26,402.

Parker Rust-Proof Net Doubles

Parker Rust-Proof Co. and subsidiary report for March quarter, net income of $329,850 after depreciation and federal income taxes, but before provision for federal surtax on undistributed profits, equivalent after allowing for preferred dividend requirements, to 76 cents a share on 429,498 shares (par $2.50) of common stock. This compares with $250,393 or 58 cents a share in previous year.

Consolidated Chemical's Big Gain

Consolidated Chemical Industries reports for first 1937 quarter, net profit of $360,186 after depreciation, normal federal income taxes, etc., equivalent, if applied directly to Class A preference stock and giving no consideration to the participating provisions of the shares, to $1.50 a share on 240,000 no-par shares of $1.50 cumulative participating Class A preference stock. This compares with $106,888 or 45 cents a share on Class A preference stock in March quarter of previous year.

Fyr-Fyter Co.'s Good Quarter

Net profit of Fyr-Fyter Co. for quarter ended March 31, 1937, was $24,690 after charges and federal income taxes comparing with net profit of $9,737 in previous year.

United Dyewood Earns $2.21

United Dyewood Corp. and subsidiaries report for year ended Dec. 31, 1936, net income of $514,155 after depreciation, federal and foreign income taxes, minority interest, etc., equivalent after 7% preferred dividends to $2.21 a share (par $10) on 139,000 shares of common stock. This compares with $403,874 or $1.38 a common share in 1935.

Current assets as of December 31, 1936, including $1,522,537 cash, U. S. Treasury certificates and marketable securities, amounted to $4,591,934 and current liabilities and reserve were $1,179,637. This compares with cash, U. S. Treasury certificates and marketable securities of $1,400,661, current assets of $4,843,851 and current liabilities and reserve of $1,553,688 on December 31, 1935.

Vanadium Corp. of America has applied to the New York Stock Exchange for listing of 95,120 additional capital shares, and cancellation of previously authorized listing of 62,500 shares. Of the new listing, 16,000 shares will provide for conversion of the new $600,000 of 3½% notes, and 79,120 shares of conversion of the $2,967,000 5% debentures, in each instance at $37.50 a share. The 62,500 shares cancelled have not been issued, but were reserved for conversion of the 5% debentures at the original conversion price of $80 a share.

Tennessee Corp. Refunding Notes

Tennessee Corp. stockholders approved reduction of capital stock from $5,292,675 to $4,310,335 and the number of shares authorized from 1,058,535 to 862,067 shares, of $5 par. They also authorized directors to proceed at their discretion with the issuance of bonds not to exceed $5,000,000 for the purpose of refunding $4,046,300 6% series B and C debentures now outstanding. The refunding proposal was outlined to stockholders in a letter on March 16.

When asked by one stockholder at the recent annual meeting concerning possible competition from the fertilizer activities of the Tennessee Valley Authority, E. H. Westlake vice president, said that the TVA is as yet not a competitive factor, but that if it decided to enter into production on a big scale, the fertilizer business of commercial producers might suffer.

Jacob Goldschmidt, of New York, was elected a director to succeed J. H. Susmann. Other directors were reelected.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1937	Net income 1936	Common share earnings 1937	Common share earnings 1936	Surplus after dividends 1937	Surplus after dividends 1936
Abbott Laboratories:							
Twelve months, Mar. 31	$1.60	$1,510,379	$1,198,782	*h*$2.36	*h*$2.00	......	......
Air Reduction:							
March 31 quarter	§1.00	1,950,938	1,430,231	.77	.57	*......	*......
American Cyanamid Co.:							
March 31 quarter	§.60	1,364,640	738,015	.54	.29	*......	*......
Barber Co., Inc.:							
March 31 quarter	*w*.25	158,716	†88,471	.40		......	......
Twelve months, Mar. 31	*w*.25	691,732	8,611	*h*1.77	*h*.02	......	......
Bon Ami Co.:							
March 31 quarter	*b*2.50	317,309	245,556	*b*.87	*b*.70	......	......
Butte Copper & Zinc Co.:							
March 31 quarter	*w*.05	29,193	†3,505	.05	....	......	......
Consolidated Chem.							
March 31 quarter	§1.50	360,186	106,888	*a*1.50	*a*.45	......	......
du Pont							
g March 31 quarter	*k*6.10	16,013,346	14,713,782	*j*1.34	*j*1.21	$6,080,011	$3,119,823
Hazel-Atlas Glass Co.:							
g April 3 quarter	*w*1.25	832,490		1.91	....	......	......
g Twelve months, April 3	*w*1.25	3,223,234	3,071,176	7.42	7.07	......	......
International Printing Ink							
March 31 quarter	2.00	405,086	242,801	1.05	.54	160,532	24,326
Twelve months, Mar. 31	2.00	1,461,399	1,114,051	3.67	2.67	......	......
Jones & Laughlin							
March 31 quarter	*f*....	1,982,394	†933,279	1.65	....	......	......
McKesson & Robbins,							
March 31 quarter	*f*....	979,691	571,005	.45	.12	......	......
Molybdenum Corp.							
Year, December 31	*f*....	45,258	258,872	.08	.44	......	......
Monsanto Chemical Co.:							
March 31 quarter	§1.00	1,333,854	1,032,852	*h*1.20	*h*1.03	......	......
Paraffine Companies, Inc.:							
March 31 quarter	*w*1.00	541,722	381,551	1.09	.80	......	......
Nine months, March 31	*w*1.00	1,785,919	1,520,041	3.60	3.19	......	......
Penick & Ford, Ltd.:							
March 31 quarter	*w*.75	90,460	388,280	.24	1.05	......	......
Pennsylvania Salt Mfg.							
Twelve months, Mar. 31	*k*9.00	1,724,403	1,168,662	11.50	7.79	......	......
Phillips Petroleum Co.:							
March 31 quarter	§2.00	5,615,637	3,156,159	*h*1.26	*h*.76	......	......
Sharp & Dohme, Inc.:							
March 31 quarter	*f*...	539,485	310,521	.43	.14	......	......
Solvay Amer. Investment							
Year, March 31	*y*6.75	3,121,842	2,201,059	7.79	4.65	311,557	494,365
Staley Mfg. Co., A. E.:							
Twelve months, Mar. 31	*k*5.00	1,378,421	766,511	....	....	......	......
Tennessee Corp.:							
Year, December 31	*k*.15	353,298	186.104	.41	.21	225,244	......

† Net loss; ‡ Profit before federal income taxes; § Plus extras; *a* On Class A stock; *c* On combined Class A and Class B shares; *f* No common dividend; *g* Report subject to audit and year-end adjustments; *h* On shares outstanding at close of respective periods; *k* Paid in year 1936; *p* On preferred; *r* On first preferred stock; *w* Last dividend declared; period not announced by company; *y* Declared in last 12 months.

Atlas Sales Up 22%

Atlas Powder and subsidiaries report for quarter ended March 31, net profit of $361,081 after depreciation, federal income taxes, etc., equivalent after preferred dividends paid, to $1.10 a share on 250,032 no-par shares of common stock, excluding shares held by company. This compares with $355,136 or $1.01 a share on 249,966 common shares in March quarter of previous year.

Sales for first quarter of 1937 amounted to $4,312,110 as compared with $3,601,-351 for first quarter of 1936, an increase of $710,759 or 19.7%.

Sales for the 12 months ended March 31, 1937, amounted to $16,606,059, against $13,604,289 in 12 months ended March 31, 1936, an increase of $3,001,770, or 22%.

Consolidated balance sheet as of March 31, 1937, compares as follows:

ASSETS	1937	1936	1935
‡Prop plant & eqpt	$6,957,178	$6,721,959	$6,975,546
Goodwill, pats, etc.	4,053,042	4,053,002	4,052,968
Cash	2,626,999	2,627,470	3,189,329
U. S. Govt secur	275,000	1,257,000	1,397,000
Other mar secur..	650,699	750,935	845,287
Accts & notes rec, after res	2,970,895	2,105,973	1,878,781
Inventories	3,014,294	2,466,658	2,667,268
Deferred chgs	49,178	49,219	42,629
Secur uncon sub cos	956,940	956,940	910,280
Inv in Atl Pwd stk	†3,137,959	3,137,396	1,582,678
Miscel invest	309,030	368,350	459,557
Total	$25,001,214	$24,494,902	$24,001,323
LIABILITIES			
Pfd stock	$9,860,900	$9,860,900	$9,860,900
Com stock	*8,717,125	8,714,625	8,714,625
Accounts pay, etc.	927,546	672,986	483,725
Accrd fed'l tax..	267,414	213,261	176,934
Accrd pfd divs ..	57,164	68,597	82,730
Res for stk bonus awards	16,826	......	......
Res for contg	452,571	508,206	497,985
Emp stk pay instal	47,218	......	......
Capital surplus ..	1,250	......	......
P & L surplus ..	4,653,200	4,456,327	4,184,424
Total	$25,001,214	$24,494,902	$24,001,323

* Represented by 261,514 no-par shares, including shares owned by company.
† Consists of 30,012 shares of preferred and 11,482 shares of common stock.
‡ After reserve for depreciation and obsolescence.

Cyanamid's 1936 Balance Sheet

Final report of American Cyanamid's last year's business reveals an improved position both in current earnings and basic figures:

Calendar Years—	1936	1935
Net operating profit	$8,827,967	$7,738,826
Divs., int. & discount	618,132	421,983
Profit on foreign exch.	......	......
Other income (net)	340,681	378,888
Total income	$9,786,780	$8,539,697
Research, process & market development exp.	1,542,076	1,186,538
Int. & discount paid	407,790	437,061
Deprec. and depletion	2,285,728	2,118,016
Prov. for income tax	*1,009,281	622,201
Minor. stockhldrs' int. in net inc. of subs.	86,973	113,722
Net income	$4,454,930	$4,062,160
Dividends	2,520,368	1,134,166
Surplus	$1,934,562	$2,927,994
Shs. combined class A & B stock outstanding	2,520,368	2,520,368
Earnings per share	$1.77	$1.61

* Including $52,050 surtax.

Consolidated Balance Sheet Dec. 31

Assets—	1936	1935
†Land, bldgs., &c	$24,100,933	$22,737,616
Accts. receivable	5,636,873	4,651,313
Notes & trade acceptances receiv.	175,500	119,163
Cash	8,465,730	9,650,221
Marketable secur.	99,873	174,612
Other inv. & adv.	878,330	660,253
Inv. in So. Alkali Corp.	4,312,000	3,724,000
Inventories	13,383,063	12,555,446
Stock purch. contract	85,027	400,429
License, pats. &c.	5,000,000	5,000,000
‡Deferred charges	720,686	762,688
Goodwill	1	1
Total	$62,858,018	$60,435,742
Liabilities—	1936	1935
§Capital stock	$25,203,680	$25,203,680
Funded debt	7,666,000	8,333,000
Min. int. in sub. cos.	1,118,996	1,448,635
Tr. accept. & pur. money obligations	333,994	280,770
Accts. pay., accrd. wages and taxes	5,363,094	4,354,529
Notes pay. banks	667,000	667,000
Accrued int. on funded debt	111,461	112,914
Res. for conting	2,375,918	2,193,526
Prov. for Fed. tax	996,412	632,872
Earned surplus	12,497,385	10,562,823
Capital surplus	6,524,076	6,645,994
Total	$62,858,018	$60,435,742

† After depreciation and depletion of $35,404,027 in 1936 and $34,126,639 in 1935.
‡ Includes unamortized debt discount and expenses.
§ Represented by 65,943 shares of class A common ($10 par) and 2,454,425 shares of class B common ($10 par), including shares reserved for stocks not yet presented for exchange but excluding 157,674 shares in B stock held by subsidiary companies.

Chemicals in Wall Street

Mexican Quicksilver Co., a holding company, has filed a registration statement with the Securities and Exchange Commission covering 160,000 shares of common stock $1 par. Proceeds will be used for subsidiary plant and properties and for working capital. No underwriter is named.

Regular quarterly dividends of the Smith Agricultural Chemical Co., Columbus, Ohio, totaling $10,592.50, have been declared. The regular quarterly dividend of $1.50 on the 6 per cent. preferred stock amounted to $4,875 of the total and a dividend of 12½ cents per share on the common came to $5,717.50.

Both dividends were payable May 1, as of record April 20.

Estate of M. M. Belding as of March 15 owned 31,000 shares of the capital stock of International Salt Co. This is equivalent to 13.28% of the 233,382 shares of the company's capital stock outstanding.

Lehn & Fink Products Co. directors have declared semi-annual dividend of 62½ cents per share on the common stock, par $5, payable June 14 to holders of record May 28. This compares with 87½ cents paid on Dec. 1, last; 62½ cents paid on June 1, 1936, and 50 cents paid on Dec. 1, 1935.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Allied Chem. & Dye, q	$1.50	Apr. 9	May 1
Am. Distilling, $10 par. pf., In. S.	25c	Apr. 15	May 1
Am. Home Prods., m	20c	Apr. 14	May 1
Am. Metal, r	25c	May 21	June 1
Am. Metal, pfd, q	$1.50	May 21	June 1
Am. Smelt. & Ref., q	75c	May 7	May 29
Archer-Daniels-Midland, pf., q	$1.75	Apr. 20	May 1
Archer-Daniels-Midland	50c	May 21	June 1
Atlantic Refinery, pf., q	$1.00	Apr. 5	June 1
Blue Ridge Corp..	15c	May 5	June 1
Blue Ridge Corp. $3 cv. pf., q	75c	May 5	June 1
(Optional payment 1-32 share of common)			
Celanese Corp. of Am. 7% pt. pf., s	$3.50	June 15	June 30
Celanese Corp. of Am. 7% cu. pf., q	$1.75	June 15	July 1
Celotex Corp., 5% pf., q	$1.25	Apr. 24	May 1
Cerro de Pasco Copper	$1.00	Apr. 19	May 1
Colgate-Palmolive-Peet, q	12½c	May 6	June 1
Dow Chem.	75c	May 1	May 15
Dow Chem., pf., q	$1.25	May 1	May 15
Fansteel Met., $5 pf., q	$1.25	June 15	June 30
Fansteel Met., $5 pf., q	$1.25	Sept. 15	Sept. 30
Fansteel Met., $5 pf., q	$1.25	Dec. 15	Dec. 17
Freeport Sulphur, q	25c	May 15	June 1
Freeport Sulphur, pf., q	$1.50	July 15	Aug. 2
Hercules Powder, pf., q	$1.50	May 4	May 15
Intern'l Nickel, pf., q	$1.75	Apr. 1	May 1
McKesson & Robbins, pf., q	75c	May 31	June 15
Nat'l Distillers, q	50c	Apr. 15	May 1
Nat'l Lead, Class B, pf, q	$1.50	Apr. 16	May 1
Nat'l Lead, pf. A, q	$1.75	May 28	June 15
New Jersey Zinc, e	50c	Apr. 20	May 10
New Jersey Zinc, q	50c	May 20	June 10
Parker Rust Proof, q	37½c	May 10	June 1
Parker Rust Proof, pf, s	35c	May 10	June 1
Procter & Gamble, e	50c	Apr. 23	May 15
Procter & Gamble, q	50c	Apr. 23	May 15
Reynolds Metals..	25c	May 15	June 1
Reynolds Metals, pf., q	$1.37½	June 21	July 1
Sharp & Dohme, pf., q	87½c	Apr. 16	May 1
Shawinigan Wat. & Pwr., q	20c	Apr. 28	May 15
Sherwin Williams, q	$1.00	Apr. 30	May 15
Sherwin Williams, e	$1.00	Apr. 30	May 15
Sherwin Williams, pf., q	$1.25	May 15	June 1
Solvay Am. Invest., 5½% pf., q	$1.37½	Apr. 15	May 15
United Dyewood, pf., q	$1.75	June 10	July 1
United Dyewood, pf., q	$1.75	Sept. 10	Oct. 1
United Dyewood, pf., q	$1.75	Dec. 10	Jan. 3
Wesson Oil & Snowdrift, pf., q	$1.00	May 15	June 1
Westvaco Chlorine, pf., q	37½c	Apr. 10	May 1
Westvaco Chlorine, q	25c	May 10	June 1

E. G. Budd Manufacturing Co. now has control of 53.3% of the common stock of the New Process Rayon, Inc., according to a report filed with the SEC. Prior to March 3, last, Budd owned 19.1%, but on that date Industrial Rayon Corp. transferred to Budd 22,125 common shares of New Process Rayon. As a result Budd Manufacturing owns 49.8%, to which is added the 3.5% owned by Budd International Corp., a subsidiary.

Chemical Stocks and Bonds

Apr. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales: Number of shares Apr. 1937	Sales: Number of shares 1937	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1936	Earnings** $-per share-$ 1935
NEW YORK STOCK EXCHANGE														
74	80¼	68½	86½	58	57½	35	19,800	84,700	Air Reduction	No	2,523,065	$2.50	2.79	2.10
231½	258½	224	245	157	173	125	10,700	56,600	Allied Chem. & Dye	No	2,214,099	6.00	11.44	8.71
87	101½	83	89	49	57¾	41½	5,100	32,600	Amer. Agric. Chem.	No	210,934	2.50	4.71	6.37
25	30¾	24⅛	35⅜	20½	35¾	22½	37,300	118,900	Amer. Com. Alcohol	20	260,947	.50	4.55	3.16
40¾	46	40	50	37	52	36	5,100	23,700	Archer-Dan-Midland	No	549,546	3.00	3.20	3.46
73¼	94	72¼	84	48	48½	32¾	2,500	15,500	Atlas Powder Co.	No	248,660	3.50	4.21	2.81
113¾	133	113¾	131	112	115	106¾	200	1,230	5% conv. cum. pfd.	100	88,781	5.00	20.86	16.93
36¼	39¼	26⅝	32¼	21¾	35⅜	19½	290,400	854,100	Celanese Corp. Amer.	No	1,000,000	1.50	2.25	1.99
108	113½	106½	116	106	111¼	97½	2,500	7,500	prior pfd.	100	164,818	7.00	27.25	35.34
22	25¾	19⅛	21¼	13	21	15⅛	63,500	422,300	Colgate-Palm.-Peet	No	1,956,086	.75	1.40	1.36
102½	104½	102¼	106½	100	107¼	101	600	7,400	6% pfd.	100	246,496	6.00	17.12	16.79
117	125¾	112¼	136½	94	101¼	67	5,100	22,000	Columbian Carbon	No	537,586	5.75	7.48	5.56
15⅜	21¼	14⅝	24⅝	14¼	23⅞	16½	73,200	711,800	Commercial Solvents	No	2,635,371	.80	.84	1.02
58¾	71¼	57⅜	82½	63⅝	78⅜	60	25,200	107,400	Corn Products	25	2,530,000	3.75	3.86	2.62
160	171½	160	170	158	165	148¼	700	3,500	7% cum. pfd.	100	243,739	7.00	46.76	33.97
63	76⅛	61	63	42	50⅜	35½	1,400	12,000	Devoe & Rayn. A	No	95,000	2.00	4.49	2.89
154	180⅛	148½	184¾	133	146½	86⅝	39,800	140,700	DuPont de Nemours	20	11,049,470	6.10	7.56	5.04
132	135½	131½	136½	129	132	126⅞	900	7,000	6% cum. deb.	100	1,092,699	6.00	84.21	56.81
154	175¼	151	185	156	172¼	110½	9,900	38,600	Eastman Kodak	No	2,250,921	6.75	8.24	6.90
152	163	150	166	152	164	141	470	1,480	6% cum. pfd.	100	61,657	6.00	306.64	258.09
26¼	32¼	25¾	35⅝	23½	30⅝	17¼	30,500	184,700	Freeport Texas	10	796,380	1.00	2.43	1.78
110	117	109½	135	108	125	112½	170	450	6% conv. pfd.	100	12,031	6.00	163.38	121.30
43½	51½	41	55¼	39½	49½	23⅜	20,100	128,500	Glidden Co.	No	603,304	2.00	3.29	2.91
52½	58⅛	52½	56	52¼			2,100	10,900	4½% cum. pfd.	50	200,000	2.25	15.43	.....
104	109¾	101	133	99⅝	119½	85	1,700	11,000	Hazel Atlas	25	434,409	7.64	6.56	7.58
155	185	150½	5⅞	2⅞	90	71	2,300	13,400	Hercules Powder	No	583,672	5.44	6.33	4.23
128	135½	128	47¼	22¾	131	122	60	780	6% cum. pfd.	100	105,765	6.00	48.97	36.30
43½	47½	36¼	66⅜	43¼	36⅜	23½	105,400	237,900	Industrial Rayon	No	606,500	2.10	2.24	1.00
6⅞	9⅛	5	30	23	5	2⅝	122,500	488,600	Intern. Agricul.	No	436,049	None	—1.55	.23
52	63½	42	36¾	29¾	42¾	26	31,100	90,400	7% cum. pr. pfd.	100	100,000	None	—.99	2.69
59⅛	73⅜	55⅛	80¼	47¼	47¼	22¼	156,100	768,000	Intern. Nickel	No	14,584,025	1.30	2.40	1.65
25½	28¾	25⅛	46½	32½	36¼	25	1,600	7,700	Intern. Salt	No	240,000	2.00	1.65	1.32
31	36	31	42⅜	27½	36¼	31	3,600	10,800	Kellogg (Spencer)	No	500,000	1.60	.....	.....
63¾	79	61½	103	79	49¼	21½	20,100	125,100	Libbey Owens Ford	No	2,503,168	3.50	4.15	3.26
49¾	53⅞	43⅜	36½	26⅜	37¼	24½	12,000	66,100	Liquid Carbonic	No	342,406	1.60	.....	3.06
37	41¾	35⅞	171	155	33⅞	23¾	11,200	57,400	Mathieson Alkali	No	830,428	1.50	1.76	1.44
85½	101	85	147	137¾	94¾	55	9,700	48,800	Monsanto Chem.	10	1,114,409	3.00	4.01	3.84
34⅛	44	31½	40	9	20⅝	14½	36,600	241,700	National Lead	10	3,095,100	.875	1.71	1.08
154¾	171	154¾	164	125	162½	150	400	2,000	7% cum. "A" pfd.	100	213,793	7.00	33.83	25.40
133	150	133	56	40¼	140½	121⅝	80	860	6% cum. "B" pfd.	100	77,462	6.00	74.50	49.05
30	41¾	28	122½	115¾	10⅞	4⅜	33,400	481,300	Newport Industries	1	519,347	.60	.98	.57
85½	87½	82½	13	5⅝	129	80	4,100	23,000	Owens-Illinois Glass	25	1,330,602	6.00	7.53	6.52
61¼	65½	55½	146	84	53¾	42⅜	21,100	137,100	Procter & Gamble	No	6,410,000	1.87	.....	2.39
115	118½	114½	135	126	121	115	380	1,550	5% pfd. (ser. 2-1-29)	100	171,569	5.00	.....	94.14
12	15⅜	10¾	41⅜	25⅝	8¾	4	51,100	249,000	Tenn. Corp.	5	853,696	.15	.47	.22
36¾	44	35½	44¾	33	36¾	28¾	103,200	207,200	Texas Gulf Sulphur	No	2,540,000	2.50	.....	1.94
99	111	95	105¼	71⅝	75¾	44	49,200	183,800	Union Carbide & Carbon	No	8,903,138	2.30	4.09	3.06
73½	91	69¾	96¾	68	78	46	7,000	34,100	United Carbon	No	397,877	4.05	5.54	4.71
35	43⅝	34¼	59	31¼	50⅝	35⅛	48,100	257,800	U. S. Indus. Alco.	No	391,033	1.00	—.20	2.16
28¾	39⅜	26	30½	16¼	21¾	11¼	39,200	432,000	Vanadium Corp.-Amer.	No	366,637	None	.40	—1.13
9⅛	12¾	7⅜	8½	4⅛	4⅝	2½	179,600	576,200	Virginia-Caro. Chem.	No	486,000	None	—2.59	—.79
56¾	74⅜	52	58¾	28¾	35¾	17½	59,900	189,700	6% cum. part. pfd.	100	213,392	None	.16	4.20
20⅝	27¼	20	32	19¾	25½	16¾	3,300	33,800	Westvaco Chlorine	No	284,962	.75	1.39	1.63
30	34⅞	30	35¼	31¾			2,700	18,300	Westvaco Chlorine, cum. pfd.	30	192,000	1.50	3.26	.....
NEW YORK CURB EXCHANGE														
29	35⅞	26⅝	40¾	29¼	30	15	59,200	247,400	Amer. Cyanamid "B"	No	2,404,194	1.00	1.77	1.61
1⅞	2⅞	1⅞	3¾	2⅛	4	2	1,400	13,200	British Celanese Am. R.	10	2,806,000	None	.....	—.71%
116	119¾	108½	116¼	99¼	115	90	1,900	6,925	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	24.47	21.96
11	15	10⅛	16½	9	15	7	1,200	9,800	Celluloid Corp.	15	194,952	None	—.80	—.95
12½	14⅝	12½	15	11⅞	14½	11⅜	300	2,200	Courtaulds' Ltd.	1 £	24,000,000	7½%	.....	7.51%
140	159¼	134	142¼	94⅜	105½	80½	3,200	12,900	Dow Chemical	No	945,000	2.40	.....	4.42
8½	10⅝	6¾	10¾	5	12½	6¼	3,600	43,300	Duval Texas Sulphur	No	500,000	.50	.61	.16
41	42⅞	39⅞	55	39	58	37	4,000	7,400	Heyden Chem. Corp.	10	149,997	2.25	3.56	3.22
128	147½	125	140	98¼	97¼	46¾	6,300	28,700	Pittsburgh Plate Glass	25	2,141,305	6.00	.....	5.32
131¾	154¾	131	154½	117	128⅞	84	5,250	25,900	Sherwin Williams	25	635,583	4.00	8.04	6.19
108	114	108	116	110	113½	106	30	700	5% pfd. cum.	100	155,521	5.00	41.44	33.17
PHILADELPHIA STOCK EXCHANGE														
167½	175¾	162	179	114¼	116¾	76½	425	2,870	Pennsylvania Salt	50	150,000	8.50	10.59	7.74

Apr. Last	1937 High	1937 Low	1936 High	1936 Low	1935 High	1935 Low	Sales Apr. 1937	Sales 1937	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
107	109½	105⅝	117½	107¾	116	104½	449,000	1,987,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
36½	42½	36	42½	27½	29¾	7⅜	165,000	1,472,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5		12,433,000
102⅞	103⅜	102⅛	102¾	92½	94½	77½	85,000	325,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
100½	102	100½	102¾	96¾	100¼	91⅛	37,000	122,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
38	43⅞	37	39	21	21½	7	208,000	1,389,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
21	25½	20¾	35	23½	38	32⅛	1,000	14,000	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
103	105	103	105	103	104	91½	27,000	133,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
104	111	98¼	98½	85¾	94¼	66	323,000	1,049,000	Vanadium Corp. conv. 5's	1941	5	A. A.	4,261,000

* Paid in 1936, including extras; ** For either fiscal or calendar years.

Industrial Trends

Higher Chemical Prices Forecast for Autumn—Slump in Commodity and Security Prices—Business Activity Running Higher—

In many quarters the opinion is expressed that at the turn of the half year period a widespread increase in chemical prices will be placed in effect. Higher raw material costs and higher wage schedules have raised manufacturing costs substantially in the past 6 months. It is very difficult to obtain comment as to what specific products will be affected. The decline in the commodity markets in the past few weeks will probably not halt such advances, unless the bearish movement continues, for even at current levels raw material prices are much higher than they were at the corresponding period of last year. Obviously most of the possible advances will be in the heavy chemical group for it is in this division that the least number of increases have taken place in the recovery period.

No further change in the Texas sulfur tax situation has been reported. Sulfur producers indicate they are moving heavy tonnages, particularly into the fertilizer producing centers.

Lacquer producers are again active with the cessation of labor troubles in the Detroit area. The April rate of automobile production was the highest for any single month since 1929 and production during the last half of the month was at a monthly rate of 600,000 units. All authorities agree that current second quarter production is at the highest level since the boom era. *Automotive Industries* expresses the belief that it probably will be late June before output can make any headway against sales.

Paint producers are anxiously awaiting the announcements of prices for the third quarter. In general the feeling prevails that many of the earth and chemical colors and pigments will be advanced and for this reason consumers are ordering in fairly large reserve supplies.

The naval stores markets were not spared in the general decline in commodity prices of last month. Larger price declines might have taken place, except for the fact that the movement to the primary markets has been below expectations. However the favorable weather conditions of the past few weeks are likely to bring an accelerated flow of shipments to the Savannah and Jacksonville markets.

The question of a government loan on the production of turpentine this season is still unsettled. In some quarters there has been talk of forming a private organization to lend support to primary markets but the suggestion is not gaining much support, according to advices from the South.

Throughout the month general business activity continued its upward trend, almost all fields of production showing gains. The "N. Y. Times" index figure reached a new high of 107.6, a full point's rise. Steel production registered a new all-time high, with automotive activity showing the greatest gain since the middle of February. Electric output, bituminous coal production, petroleum runs to stills and lumber cut also made gains. The "Iron Age" reported the steel operating rate as having dropped to 90.5% the past week of the month due to the Ohio River floods. This authority estimated the Wheeling steel district as having dropped to 75% against 99% the previous week. It is stated that no marked change from a 90% to 92% operating rate in the steel industry is looked for during May at least.

The drastic decline in the securities markets, together with wide open breaks in commodity markets were the bad signs. Stocks plunged to a new low for the year in selling that brought losses in individual active stocks ranging up to 20 points.

Production of electricity in the United States for the week ended April 24 totaled 2,188,124,000 kilowatt hours, which was an increase of 14.3% over a year ago. The rapid rise in purchasing power in recent weeks continues to promise further substantial gains in trade activity. Cash incomes of industrial workers and of farmers as well now are the largest for any period since 1929. Retail sales for the country as a whole, according to Dun & Bradstreet survey, were from 8% to 20% greater than the same week of 1936, and 2% to 5% heavier than the previous week.

National Oil Products has established an all-time record sales since the first of the year. President Gulick to the stockholders: "Not only have sales been well above any previous first quarter, but subject to confirmation by auditors, indications are that net earnings after proper reserves, will be well above 90 cents per share as against 57 cents per share in the same period last year."

Statistics of Business

	March 1937	March 1936	February 1937	February 1936	January 1937	January 1936
Automotive Production	499,014	323,160	363,833*b*	......	379,843	364,004
Bldg. Contracts*‡	$231,246	$199,028	$188,590	$140,417	$242,844	$214,792
Failures, Dun & Bradstreet	*d*183	*d*196	721	856	811	1,077
Merchandise Imports‡	......	$200,295	$277,805	$192,774	$240,396	$187,482
Merchandise Exports‡	......	$195,336	$232,504	$182,029	$221,550	$198,564
Newsprint Production						
Canada, tons	......	243,900	275,532	221,569	287,691	227,955
U. S., tons	......	76,507	72,072	72,252	80,005	79,362
Plate glass, prod., sq. ft. ..	......	16,057,196	18,676,371	13,856,937	6,373,282	17,275,632
Steel ingots production, tons	5,229,431	3,346,489	4,424,659	2,964,418	4,736,697	3,045,746
Pig iron production, tons ..	3,459,473	2,040,311	2,999,218	1,823,706	3,211,500	2,025,885
U. S. consumption, crude rubber, tons	......	42,703	44,715	36,746	43,339	48,506
Tire shipments	......	3,855,970	......	......	......	3,874,764
Tire production	......	3,637,969	......	......	......	4,578,710
Tire inventory	......	9,087,020	......	......	......	8,918,177
Dept. of Labor Indices†						
Factory payrolls, totals† ..	101.2	76.3	95.7	73.7	90.6	95.1
Factory employment† ...	101.0	84.1	98.9	86.9	96.4	86.8
Chemical employment†*a* ..	125.0	113.8	121.9	109.1	120.9	110.8
Chemical payrolls†*a*	129.2	102.2	123.9	97.5	119.5	98.8
Chemicals and Related Products						
Exports‡	$12,149	$10,608	$9,950	$8,936	$9,200	$9,096
Imports‡	$10,781	$7,327	$9,739	$7,946	$8,486	$5,955
Stocks, mfg. goods	......	132	......	128	......	124
Stocks, raw materials	......	81	......	89		98
Boot and shoe production ..	......	34,159,271	......	......	36,674,179	33,355,004

Week Ending	Carloadings 1937	Carloadings 1936	Carloadings % of Change	Electrical Output§ 1937	Electrical Output§ 1936	Electrical Output§ % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	‡‡Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
Mar. 27	761,109	594,789	+27.96	2,200,143	1,862,387	+18.1	92.6	95.3	89.7	71.2	76.9	88.6	87.0	90.7	106.6	94.4
Apr. 3	726,687	613,581	+18.4	2,146,959	1,867,093	+15.0	92.9	95.3	84.6	71.3	76.9	88.7	87.0	89.9	106.3	94.7
Apr. 10	716,044	621,843	+15.1	2,176,368	1,916,486	+13.6	92.4	95.4	86.4	71.3	76.9	88.2	87.0	90.3	107.4	94.5
Apr. 17	751,328	642,278	+17.0	2,173,223	1,933,610	+12.4	91.9	95.4	83.4	71.3	77.0	88.0	86.6	91.3	107.4	94.3
Apr. 24	761,182	616,937	+14.3	2,188,124	1,914,710	+14.3	91.7	94.8	80.9	71.4	77.0	87.7	....	92.3	107.6	93.8

* 37 states; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; ‡ 000 omitted; § K.W.H., 000 omitted; *a* Includes all allied products but not petroleum refining; ‡‡ 1926-1928 = 100.0; *y* Preliminary; *z* Revised; *b* Figures for U. S. revised as a result of correspondence; *d* Figures for week ending April 29.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1936 Average $1.18 - Jan. 1936 $1.19 - April 1937 $1.10

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.32	.43	.32	.43	.38	.43
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.24	.26
Acetic Anhydride, 100 lb cbys lb.	.20	.24	.20	.24	.21	.25
drs, f.o.b. wks, frt allowed lb.	.14	.15	.14	.15	...	.15
Acetin, tech, drs lb.	.22	.24	.22	.24	.22	.24
Acetone, tks, f.o.b. wks, frt allowed lb.	...	.05½	.05½	.06½	.06	.11
drs, c-l, f.o.b. wks, frt allowed lb.	...	.06½	.06½	.07½	.07	.12
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.09¾	.10	.06¾	.10	.06¾	.07
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.53	2.25	2.53	...	2.45
glacial, bbls, c-l, wks 100 lbs.	...	8.70	8.00	8.70	...	8.43
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.75	10.50	12.43	...	12.43
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	.85	.95	.85	.95	.85	.95
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, delv 100 lbs.	1.35	2.50	1.35	2.50	1.35	2.50
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.40	.45
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	95.00	...	95.00	...	95.00
Broenner's, bbls lb.	...	1.11	...	1.11	1.11	1.25
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs lb.	...	.22	...	.22	...	.22
wks lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	...	5.25
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%. drs, delv lb.	.14¾	.16¾	.14¾	.16¾	.14¾	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.25	.26	.25	.26	.25	.29
anhyd, gran, bbls lb. *b*	...	.29	...	.29	.29	.31
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	...	.85	.72	.85	.51	.74
99%, straw, LB, drs, wks, frt equal gal.	...	.90	.77	.90	.68	.79
resin grade, drs, wks, frt equal lb.	...	.10¾	.09	.10¾	.52*y*	.65*y*
Crotonic, drs lb.	.90	1.00	.90	1.00	.90	1.00
Formic, tech, 140 lb drs lb.	.11	.13	.11	.13	.11	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb. drs lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls lb.	.65	.68	.65	.68	.65	.68
USP, bbls lb.	.77	.80	.77	.80	.70	.80
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	.80	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 10% sol. cbys lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.11	.12
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.05
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.07
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.12
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.10
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.14½
USP X, 85%, cbys lb.	.45	.50	.45	.50	.45	.50
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.47
Linoleic, bbls lb.	...	.20	.16	.20	.16	.16
Maleic, powd, kgs lb.	.29	.32	.29	.32	.29	.32
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls. *y* Price given is per gal.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.35	...	1.35	...	1.35
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.45	...	1.45	...	1.45
tks, wks 100 lb.	...	1.10	...	1.10	1.10	1.20
22°, c-l, cbys, wks 100 lb.	...	1.95	...	1.95	...	1.95
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.14	.11	.14
Sludges, drs lb.	.07	.10	.06	.10	.06	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N. Y. lb.	.10¾	.12	.10¾	.12	.10¾	.12½
Phosphoric, 50%, USP, cbys lb.	.12	.14	.12	.14	.14	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.30	.40	.30	.40	.30	.40
Propionic, 98% wks, drs lb.		.22	...	.22	...	.35
80% lb.	.16	.17½	.16	.17½	.15	.17½
Pyrogallic, crys, kgs, wks lb.	1.55	1.65	1.55	1.65	1.55	1.65
Ricinoleic, bbls lb.	...	.38	.35	.38	...	...
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.40
Sebacic, tech, drs, wks lb.	...	.58	...	.58	...	.58
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.19
Sulfuric, 60°, tks, wks ton	...	12.00	...	12.00	11.00	12.00
c-l, cbys, wks 100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks ton	...	15.50	...	15.50	...	15.50
c-l, cbys, wks 100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb	.19	.36	.19	.36	.19	.40
Tartaric, USP, gran, powd, 300 lb bbls lb.	...	.22¾	.21¾	.22¾	.22¾	.24
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.72½
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.45	2.75
kgs lb.	...	1.75		1.75	...	1.75
Tungstic, tech, bbls lb.	...	2.75	2.50	2.75	1.50	1.60
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.47	.60	.47	.60	.50	.60
dark, bbls lb.	.11	.15	.11	.17	.12	.17
egg, edible lb.	.76	.77	.76	.79	.77	1.05
vegetable, edible lb.	.65	nom.	...	nom.	.65	.70
ALCOHOLS						
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.123	...	.123	.123	.143
c-l, drs, delv lb.	...	.133	...	.133	.133	.150
lcl, drs, delv lb.	...	.143	...	.143	.143	.157
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	.08½	.108
Benzyl, cans lb.	.70	1.10	.65	1.10	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt allowed lb. *d*	...	.09	.08½	.09	.08½	.11
c-l, drs, f.o.b. wks, frt allowed lb. *d*	...	.10	.09½	.10	.09½	.12
Butyl, secondary, tks, delv lb. *d*	...	.07	...	.07	.07	.096
c-l, drs, delv lb. *d*	...	.08	...	.08	.08	.106
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.50	3.65	2.50	3.65	2.50	3.65
Denatured, CD, No. 11, 12, 13, c-l, drs, wks gal. *e*	...	.33	...	.33	.30	.44*
Western schedule, c-l, wks gal. *e*	...	.39	...	.39	.39	.52*
Denatured, SD, No. 1, tks	...	.26	...	.26	.23	.28
c-l, drs, wks gal. *e*	...	.29	...	.29	.29	.34
Diacetone, tech, tks, delv lb. *f*	...	.11½	...	.11½	...	.16
c-l, drs, delv lb. *f*	...	.12½	...	.12½	...	.17
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.07	...	4.07	4.07	4.10
c-l, drs gal. *g*	...	4.11	...	4.11	4.11	4.27
c-l, bbls gal. *g*	...	4.12	...	4.12	4.12	4.28
absolute, drs gal. *g*	4.54	6.08½	4.54	6.08½	4.54	6.11½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case; * Dealers were given 20% off this price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Alcohols (continued)						
Furfuryl, tech, 500 lb drs lb.	...	.35	...	.35	...	.35
Hexyl, secondary tks, delv lb.	...	.12	.11½	.12	...	.11½
c-l, drs, delv lb.	...	.13	.12½	.13	...	.12½
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delvd lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs lb.	...	.10	...	.10	.10	.12
c-l, drs lb.	...	.09½	...	.09½	.09½	.11½
tks lb.	...	.08½	...	.08½	.08½	.10½
Isopropyl, refd, c-l, drs, f.o.b. wks, frt allowed lb.	...	.39½	.39½	.45	.45	.55
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Special Solvent, tks, wks gal.	...	.27	...	.27	.24	.32
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls lb.	...	.52	...	.52	.52	.65
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	...	3.00	...	3.00	...	3.00
25 bbls or more, wks 100 lb.	...	3.15	...	3.15	...	3.15
less than 25 bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Granular, c-l, bbls. wks 100 lb.	...	2.75	...	2.75	...	2.75
25 bbls or more, wks 100 lb.	...	2.90	...	2.90	...	2.90
Powd, c-l, bbls, wks 100 lb.	...	3.15	...	3.15	...	3.15
25 bbls or more, wks 100 lb.	...	3.30	...	3.30	...	3.30
Chrome, bbls 100 lb.	7.00	7.25	7.00	7.25	7.00	7.25
Potash, lump, c-l, bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
25 bbls or more, wks 100 lb.	...	3.40	...	3.40	...	3.40
Granular, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, bbls, wks 100 lb.	...	3.00	...	3.00	...	3.00
Powd, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	3.40
25 bbls or more, wks 100 lb.	...	3.55	...	3.55	...	3.55
Soda, bbls, wks 100 lb.	4.00	4.15	4.00	4.15	4.00	4.15
Aluminum metal, c-l, NY 100 lb.	...	20.00	19.00	20.00	19.00	20.00
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	.09	.10
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.07
Solution, drs, wks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03½
Hydrate, 96%, light, 90 lb bbls, delv lb.	.13	.15	.13	.15	.13	.15
heavy, bbls, wks lb.	.029	.03½	.029	.03½	.029	.04½
Oleate, drs lb.	.16¾	.18½	.16¾	.18½	.15¾	.18½
Palmitate, bbls lb.	.22	.23	.22	.23	.21	.22
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.19	.21	.19	.21	.18	.21
Sulfate, com, c-l, bgs, wks 100 lb.	...	1.35	...	1.35	...	1.35
c-l, bbls, wks 100 lb.	...	1.55	...	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks 100 lb.	...	1.90	...	1.90	...	1.90
c-l, bbls, wks 100 lb.	...	2.05	...	2.05	...	2.05
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.15¼	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.03
Aqua 26°, tks, NH cont.	...	.04½	...	.04½	.04½	.05
tk wagon lb.	...	.02	...	.02	.02	.024
Ammonium Acetate, kgs lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls lb.	.16	.17	.16	.17	.15	.17
carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks 100 lb.	5.50	6.25	5.00	6.25	5.00	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls lb.	...	.23	...	...	...	...
Linoleate lb.	...	.15	.11	.15	.11	.12
Naphthenate, bbls lb.	...	.17	...	...	...	...
Nitrate, tech, cks lb.	.04	nom.	.04	nom.	.04	.05
Oleate, drs lb.	...	.15	.15	.10	...	.10
Oxalate, neut, cryst, powd, bbls lb.	...	.23	...	.23	.26	.27
pure, cryst, bbls, kgs lb.	.27	.28	.27	.28	.27	.28
Perchlorate, kgs lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs lb.	.21	.24	.21	.24	.21	.25
Phosphate, dibasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls lb.	...	.15	...	...	...	...
Stearate, anhyd, bbls lb.	...	.24	...	...	...	...
Paste, bbls lb.	...	.07½	...	...	...	...
Sulfate, dom, f.o.b., bulk ton	...	27.00	26.00	27.00	22.00	26.00
200 lb bgs ton	...	nom.	...	nom.	...	nom.
100 lb bgs ton	...	nom.	...	nom.	...	nom.
Sulfocyanide, kgs lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane) tks, delv lb.	...	.11½	...	.11½	.11½	.13½
tech, drs, delv lb.	.11½	.12	.11½	.13½	.12½	.149
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.108
c-l, drs, delv lb.	...	.09½	...	.09½	.118	.123
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.25	...	.25	...	...
Stearate, lcl, wks, drs lb.	...	.26	...	.26	...	...

g Grain alcohol 20c a gal. higher in each case.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.15	.17½	.15	.17½	.15	.17½
Annatto fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	...	.75	...	.75	...	.75
40% lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls lb.	...	.65	.50	.65	.50	.52
Antimony metal slabs, ton lots lb.	.16⅜	.17	.13⅝	.17	.11⅜	.14
Butter of, see Chloride.						
Chloride, soln cbys lb.	...	.17	...	.17	.13	.17
Needle, powd, bbls lb.	.17½	.19½	.14	.19½	.11	.12½
Oxide, 500 lb bbls lb.	.16½	nom.	.14¼	.16½	.12¾	.14
Salt, 63% to 65%, tins lb.	.23¾	.24	.22	.24	.22	.24
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.22	.23
Vermilion, bbls lb.	.35	.42	.35	.42	.35	.42
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Argols, 80%, casks lb.	.14	.15	.14	.15	.14	.15
Crude, 30%, casks lb.	.07	.08	.07	.08	.07	.08
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08¾	.09¾	.08¾	.09¾	.08¾	.09¾
Arsenic, Metal lb.	.42	.44	.42	.44	.40	.44
Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs lb.	.03	.04	.03	.04	.03	.04½
Asbestine, c-l, wks ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip, 200 lb bgs, wks ton	52.50	62.50	52.50	62.50	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs ton	...	44.00	42.00	45.00	42.00	45.00
Chlorate, 112 lb kgs NY lb.	.16½	.17½	.16½	.17½	.15½	.17½
Chloride, 600 lb bbl, wks ton	72.00	74.00	72.00	74.00	72.00	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.04¾	.05½	.04¾	.05½	.05¼	.06
Nitrate, bbls lb.	...	.07	...	.07	.07	.08¼
Barytes, floated, 350 lb bbls wks ton	23.65	31.15	23.65	31.15	23.65	31.15
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, No. 1, bgs, wks ton	...	16.00	...	16.00	...	16.50
No. 2 ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed gal.	...	.16	...	.16	.16	.18
90% c-l, drs gal.	...	.23	...	.23	...	.23
Ind pure, tks, frt allowed gal.	...	.16	...	.16	.16	.18
Benzidine Base, dry, 250 lb bbls lb.	.70	.72	.70	.72	.70	.74
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs lb.	.30	.40	.30	.40	.30	.40
Beta-Naphthol, 250 lb bbl, wks lb.	.23	.24	.23	.24	.24	.27
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	.52	.51	.52	.51	.55
Bismuth metal lb.	1.00	1.10	1.00	1.10	1.00	1.10
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes lb.	...	2.95	2.75	3.04	2.95	3.00
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.23	1.58	1.23	1.58	1.40	1.45
Trioxide, powd, boxes lb.	...	3.57	3.45	3.57	3.45	3.50
Subnitrate lb.	1.22	1.48	1.30	1.48	1.30	1.35
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton *h*	40.00	75.00	40.00	75.00	42.50	70.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	...	4.00	3.90	4.30	2.50	4.25
Chicago, high grade unit	...	3.95	3.75	4.65	2.90	4.50
Imported shipt unit	...	3.95	3.90	4.10	2.60	3.75
Blues, Bronze Chinese Milori Prussian Soluble lb.	.36	.37	.36	.37	.37	.38½
Ultramarine,* dry, wks, bbls lb.	...	.10	...	.10	...	.10
Regular grade, group 1 lb.	...	.15	...	.15	...	.15
Special, group 1 lb.	...	.18	...	.18	...	.18
Pulp, No. 1 lb.	...	.26	...	.26	...	.26
Bone, 4½ + 50% raw, Chicago ton	28.00	30.00	26.00	28.00	20.00	25.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.06½	.08¼	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	...	26.00	25.00	26.25	23.00	26.00
Domestic, bgs, Chicago ton	21.00	23.00	19.00	23.00	16.00	20.00
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	40.00	...	40.00	...	40.00
bbls, delv ton *i*	...	50.00	...	50.00	...	50.00
c-l, sacks, delv ton *i*	...	44.00	...	44.00	...	44.00
c-l, bbls, delv ton *i*	...	54.00	...	54.00	...	54.00
Tech, powd, 80 ton lots, sacks ton *i*	...	45.00	...	45.00	...	45.00
bbls, delv ton *i*	...	56.00	...	56.00	...	56.00
c-l, sacks, delv ton *i*	...	49.00	...	49.00	...	49.00
c-l, bbls, delv ton *i*	...	59.00	...	59.00	...	59.00
Bordeaux Mixture, consumers, East, c-l, tins, drs, cases lb.	.10½	.11	.10½	.11	.08	.16
Dealers, East, c-l lb.	.10	.10½	.10	.10½	.08½	.16½

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

Bromine
Chromium Fluoride

Prices

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Bromine, cases	lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs	lb.	.80	1.50	.80	1.50	.80	1.50
Gold, blk	lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks	lb.	.02¼	.03¾	.02¼	.03¾	...	.04
Butyl, Acetate, norm drs, frt allowed	lb.	.10	.10½	.10	.10½	.09½	.12½
tks, frt allowed	lb.	...	.09	...	.09	.08½	.11
Secondary, tks, frt allowed	lb.	...	.07½	...	.07½	.07½	.096
drs, frt, allowed	lb.	.08½	.09	.08½	.09	.106	.111
Aldehyde, 50 gal drs, wks	lb.	.16½	.17½	.16½	.17½	.19	.21
Carbinol, norm drs, wks	lb.	.60	.75	.60	.75	.60	.75
Lactate	lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed	lb.	...	.25	...	.25	...	...
Propionate, drs	lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv	lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs	lb.	...	.25	...	.25	...	.26
Tartrate, drs	lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks	lb.	...	.35½		.35½	...	...
Cadmium Metal	lb.	...	1.20	1.05	1.20	.75	1.05
Sulfide, boxes	lb.	.90	1.00	.90	1.00	.90	1.10
Calcium, Acetate, 150 lb bgs c-l, delv	100 lb.	...	2.25	2.10	2.25	...	2.10
Arsenate, jobbers, East of Rocky Mts, drs	lb.	.06¼	.06⅜	.06	.06⅜	.06	.06⅜
dealers, drs	lb.	.06¾	.07¾	.06¼	.07¾	.06¼	.07¾
South, dealers, drs	lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
Carbide, drs	lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l	lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs, c-l, delv	ton	...	22.00	...	22.00	...	22.00
Solid, 650 lb drs, c-l, delv	ton	...	20.00	...	20.00	...	20.00
Ferrocyanide, 350 lb bbls wks	lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls	lb.	.50	.57	.50	.57	.50	.57
Nitrate, 100 lb bgs	ton		26.10	...	26.10	...	26.50
Palmitate, bbls	lb.	.22	.23	.22	.23	.21	.22
Phosphate, tech, 450 lb bbls	lb.	.06½	.07½	.06½	.07½	.07½	.08
Resinate, precip, bbls	lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls	lb.	.19	.21	.19	.21	.18	.21
Camphor, slabs	lb.	...	.55	...	.55	.50	.56
Powder	lb.	...	.55	...	.55	.4940	.56
Camwood, Bk, ground bbls	lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs	lb.	.05	.05¾	.05	.05¾	.05¼	.08
Black, c-l, bgs, delv, price varying with zone	lb.	.0445	.0535	.0445	.0535	.0445	.0535
lcl, bgs, delv, all zones	lb.	...	.07	...	.07	...	.07
cartons, delv	lb.	...	.07¾	...	.07¾	...	.07¾
cases, delv	lb.	...	.08¼	...	.08¼	...	.08¼
Decolorizing, drs, c-l	lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl	lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 1400 lb drs, delv	lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd	lb.	.14	.14½	.14	.20¾	.14½	.20¾
80-100 mesh, c-l, bgs	lb.	.14½	.15½	.14½	.21¼	.15	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks	ton	...	25.00	23.00	25.00	15.00	20.00
Imported, ship, bgs	ton	...	nom.	...	nom.	17.00	18.00
Celluloid, Scraps, ivory cs	lb.	.12	.15	.12	.15	.17	.18
Transparent, cs	lb.	.12	.13	.12	.13	...	.20
Cellulose, Acetate, 50 lb kgs	lb.	...	.40	.40	.55	.55	.60
Chalk, dropped, 175 lb bbls	lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks	lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks	lb.	.03	.04	.03	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks	bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv*	ton	27.00	30.40	27.00	30.40	24.40	30.40
Willow, powd, 100 lb bbl, wks	lb.	.06	.06¼	.06	.06¼	.06	.06¼
Chestnut, clarified, tks, wks	lb.	...	.02125	.01625	.02125	.01625	.01⅞
25%, bbls, wks	lb.	...	.02	...	.02	.01½	.02
Pwd, 60%, 100 lb bgs, wks	lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines	ton	...	6.50	...	6.50	...	7.00
Imported, lump, blk	ton	22.00	25.00	22.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks, contract	lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract	lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract	100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont	lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks	lb.	3.00	3.50	3.00	3.50	...	3.00
Chlorobenzene, Mono, 100 lb drs, lcl, wks	lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs	lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins	lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls	lb.	...	.80	...	.80	.85	.90
Chrome, Green, CP	lb.	.21	.24	.20	.24	.21½	.23
Yellow	lb.	.14½	.15½	.13	.16½	.11	.14
Chromium, Acetate, 8% Chrome, bbls	lb.	.05	.08	.05	.08	.06	.08
20° soln, 400 lb bbls	lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl	lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Coal tar, bbls .... bbl.	7.25	9.00	7.25	9.00	7.25	9.00
Cobalt Acetate, bbls ...... lb.	.58	.60	.58	.60	.58	.60
Carbonate tech, bbls .... lb.	...	1.50	1.42¾	1.50	1.35	1.48
Hydrate, bbls .... lb.	...	1.60	1.60	1.76	1.66	1.76
Linoleate, solid, bbls ... lb.	...	.31	.31	.31¼	.30	.31¼
Oxide, black, bgs ...... lb.	1.41	1.51	1.41	1.51	1.29	1.49
Resinate, fused, bbls ... lb.	...	.13	...	.13	.12½	.13
Precipitated, bbls .... lb.	...	.31½	.30½	.31½	.	.32
Cochineal, gray or bk bgs .. lb.	.32	.36	.32	.36	.32	.36
Teneriffe silver, bgs .... lb.	.33	.37	.33	.37	.33	.37
Copper, metal, electrol 100 lb.	...	14.50	13.00	16.25	9.50	12.00
Carbonate, 400 lb bbls .. lb.	.10½	.12½	.10½	.12½	...	.08¼
52-54% bbls .... lb.	...	.18	.16¼	.19	.14½	.16¼
Chloride, 250 lb bbls ... lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs .... lb.	.37	.38	.37	.38	.37	.38
Oleate, precip, bbls ..... lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks .. lb.	...	nom.	.17½	.18	.14½	.15¾
red 100 lb bbls .... lb.	...	nom.	.17	.18	.14	.15
Resinate, precip, bbls ... lb.	.15	.16	.15	.19	.18	.19
Stearate, precip, bbls ... lb.	.23	.24	.23	.40	.35	.40
Sub-acetate verdigris, 400 lb bbls .... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	5.40	4.55	6.00	3.85	4.55
Copperas, crys and sugar bulk c-l, wks .... ton	12.00	13.00	12.00	13.00	13.00	16.00
Corn Sugar, tanners, bbls 100 lb.	...	4.24	3.74	4.24	3.08	4.03
Corn Syrup, 42°, bbls .. 100 lb.	...	4.26	3.76	4.26	3.05	3.95
43°, bbls .... 100 lb.	...	4.31	3.86	4.31	3.10	4.05
Cotton, Soluble, wet, 100 lb bbls .... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls ..... lb.	...	.16¾	.15	.16¾	.15	.16¾
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ...... gal.	.13	.13½	.13	.13½	.12½	.13½
Grade 2 .... gal.	.113	.12½	.113	.12½	.109	.12
Cresol, USP, drs .... lb.	.10	.10½	.10	.10½	.10	.10½
Crotonaldehyde, 98%, drs, wks .... lb.	.26	.30	.26	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.04	.04¾	.04	.04¾	.04	.04¾
Cyanamid, bgs, c-l, frt allowed Ammonia unit	...	1.15	1.10	1.15	1.07½	1.10
Derris root 5% rotenone, bbls .... lb.	.39	.47	.39	.47	...	...
Dextrin, corn, 140 lb bgs f.o.b., Chicago ... 100 lb.	4.70	4.90	4.35	4.90	3.45	5.00
British Gum, bgs ... 100 lb.	5.05	5.25	4.60	5.25	3.70	5.40
Potato, Yellow, 220 lb bgs lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ... lb.	...	.08	...	.08	...	.08
White, 140 lb bgs .. 100 lb.	4.30	4.58	4.30	4.58	3.40	4.95
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.75	1.00
Diamylene, drs, wks ...... lb.	.095	.102	.095	.102	.095	.102
tks, wks .... lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs .... lb.	.085	.092	.085	.092	.085	.092
tks, wks .... lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks .. lb.	...	.30	...	.30	...	...
Diamylphthalate, drs, wks lb.	.19	.19½	.19	.19½	.18	.19½
Diamyl Sulfide, drs, wks .. lb.	...	1.10	...	1.10	...	1.10
Dianisidine, bbls .... lb.	2.25	2.45	2.25	2.45	2.25	2.45
Dibutoxy Ethyl Phthalate, drs, wks .... lb.	...	.35	...	.35	...	...
Dibutyl Ether, drs, wks, lcl lb.	...	.30	...	.30	...	...
Dibutylphthalate, drs, wks, frt allowed .... lb.	...	.20	.19½	.20	.18	.21
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	.35	.40
Dichlorethylene, drs ..... gal.	.29	...	.29	...	.29	...
Dichloroethylether, 50 gal drs, wks .... lb.	.15	.16	.15	.16	.16	.17
tks, wks .... lb.	...	.14	...	.14	...	.15
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		no prices		.032	.040
tks, wks .... lb.	no prices		no prices		...	.02½
Diethanolamine, tks, wks .. lb.	.31	.35	.31	.35	...	.30
Diethylamine, 400 lb drs .. lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs .. lb.	.50	.52	.50	.52	.50	.55
Diethyl Carbinol, drs ..... lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	.31⅜	.35
90% grade, drs .... lb.	...	.25	...	.25	...	.25
Diethylorthotoluidin, drs .. lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.18	.18½	.18	.18½	.18	.19
Diethylsulfate, tech, drs, wks, lcl .... lb.	...	.20	...	.20	...	.20
Diethyleneglycol, drs ..... lb.	.16½	.17½	.16½	.17½	.15½	.17½
Mono ethyl ethers, drs .. lb.	.16	.17	.16	.17	.15	.17
tks, wks .... lb.	...	.15	...	.15	...	.15
Mono butyl ether, drs .. lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs, wks .... lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls ..... lb.	...	.21	.21	.24	...	.24
Laurate, bbls .... lb.	...	.27½	...	...	...	...
Stearate, bbls .... lb.	...	.27½	...	...	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis .... lb.	...	1.00	...	.95	...	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.30
Dimethyl Ethyl Carbinol, drs lb	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt allowed .... lb.	.20½	.21	.20½	.21	.19½	.21½
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. *k*	.16	.19	.16	.19	.16	.19½
Dinitrochlorobenzene, 400 lb bbls .... lb.	.16½	.17½	.16	.17½	.14	.15½
Dinitronaphthalene, 350 lb bbls .... lb.	.35	.38	.35	.38	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.14½	.15½	.14½	.15½	.14½	.16½

k Higher price is for purified material.

Prices

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Diphenyl, bbls ....lb.	.15	.25	.15	.25	.15	.25
Diphenylamine ....lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs ....lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton	34.00	nom.	34.00	nom.	32.00	45.00
Extract ....lb.	.05	.05½	.05	.05½	.05	.05½
EGG YOLK						
Egg Yolk, dom., 200 lb cases lb.	.68	nom.	.68	nom.	.63	.68
Imported ....lb.	.56	.57	.53	.57	.48	.56
Epsom Salt, tech, 300 lb bbls c-l NY ....100 lb.	1.80	2.00	1.80	2.00	1.80	2.00
USP, c-l, bbls ......100 lb.	...	2.00	...	2.00	...	2.00
Ether, USP anaesthesia 55 lb drs ....lb.	.22	.23	.22	.23	.22	.23
(Conc) ....lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs ....lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed ......lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles ...lb.	.75	.77	.75	.77	.75	.77
Synthetic, wks, drs .....lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester						
tks, frt alld ....lb.	...	.06½	...	.06½	.06½	.08
drs, frt alld ....lb.	...	.07½	...	.07½	.07½	.09
95%, tks, frt allowed..lb.	...	.06¾	...	.06¾	.07	.08½
drs, frt alld ....lb.	...	.07¾	...	.07¾	.08	.10
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	.37	.68
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys ...lb.	...	.30	...	.30	...	.30
Crotonate, drs ....lb.	1.00	1.25	1.00	1.25	1.00	1.25
Ether, Absolute, 50 gal drs lb.	.50	.52	.50	.52	.50	.52
Formate, drs, frt allowed lb.	...	.31	...	.31	...	...
Lactate, drs, wks ......lb.	...	.33	...	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed ....lb.	.07	.07½	.07	.07½	.07	.09
tks, frt allowed ......lb.	...	.06½	...	.06½	.06½	.07½
Oxalate, drs, wks ......lb.	.30	.34	.30	.34	.37½	.55
Oxybutyrate, 50 gal drs, wks ....lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks ......lb.	...	.77	...	.77	...	...
Ethylene Dibromide, 60 lb drs ....lb.	.65	.70	.65	.70	.65	.70
Chloryhdrin, 40%, 10 gal cbys chloro, cont .....lb.	.75	.85	.75	.85	.75	.85
Anhydrous ....lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks lb.	.17	.21	.17	.21	.17	.21
tks, wks ....lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks ....lb.	.20	.21	.20	.21	.20	.21
tks, wks ....lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks ....lb.	.16	.17	.16	.17	.16	.17
tks, wks ....lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks ......lb.	...	.14	...	.14	.14	.18½
tks, wks ....lb.	...	.13	...	.13	.13	.16½
Mono, Methyl Ether, drs wks ....lb.	.18	.22	.18	.22	.19	.23
tks, wks ....lb.	...	.17	...	.17	...	.18
Oxide, cyl ....lb.	.50	.55	.50	.55	.50	.60
Ethylidenaniline ....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery ....ton	...	14.50	...	14.50	...	14.50
Powd, blk, wks ....ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls ....lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys ....lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks ....unit *l*	...	4.25	3.75	4.25	2.50	3.50
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis ....unit *m*	...	3.15	...	3.15	...	2.25
Fluorspar, 98%, bgs .....lb.	no prices		no prices		30.00	35.50
Formaldehyde, USP, 400 lb bbls, wks ....lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.07
Fossil Flour ....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines..ton	6.50	15.00	6.50	15.00	6.50	15.00
Imp powd, c-l, bgs ....ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks..lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs ....lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.16	.18
Fustic, crystals, 100 lb boxes ....lb.	.20	.23	.20	.23	.20	.23
Liquid 50°, 600 lb bbls..lb.	.08½	.12	.08½	.12	.08½	.12
Solid, 50 lb boxes ......lb.	.16	.18	.16	.18	.16	.18
G SALT PASTE						
G Salt paste, 360 lb bbls...lb.	.45	.47	.45	.47	.45	.47
Gall Extract ....lb.	.19	.20	.19	.20	.18	.20
Gambier, com 200 lb bgs..lb.	...	nom.	...	nom.	...	.06
Singapore cubes, 150 lb bgs ....100 lb.	...	.10½	.09½	.10½	.08	.09
Gelatin, tech, 100 lb cs ...lb.	.50	.55	.50	.55	.50	.55
Glauber's Salt, tech, c-l, bgs, wks* ....100 lb.	.95	1.15	.95	1.15	.95	1.30
Anhydrous, see Sodium Sulfate.						
Glue, bone, com grades, c-l bgs ....lb.	.11	.17½	.11	.17½	.10½	.17½
Better grades, c-l, bgs lb.	.12½	.17½	.12½	.17½	.12	.17½
Casein, kgs ....lb.	.18	.22	.18	.22	.18	.22

l + 10; *m* + 50; *Bbls. are 20c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Glycerin, CP, 550 lb drs . . lb.	...	.27	.27	.29	.16	.21½
Dynamite, 100 lb drs . . . lb.	...	.27	.27	.29	.13¾	.21½
Saponification, drs . . . . . lb.	.20	.20¼	.20	.29	.10¼	.22
Soap Lye, drs . . . . lb.	.18	.18¼	.18	.27	.09¼	.20
Glyceryl Bori-Borate, bbls lb.	...	.40	...	...	...	...
Monoricinoleate, bbls . . . lb.	...	.27	...	...	...	...
Monostearate, bbls . . . . . lb.	...	.30	...	...	...	...
Oleate, bbls . . . . lb.	...	.22	...	...	...	...
Phthalate . . . . lb.	...	.37	.29	.37	.28	.29
Glyceryl Stearate, bbls . . . lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls . . lb.	...	.26	...	...	...	...
Phthalate, drs . . . . lb.	...	.40	.29	.40	.29	.35
Stearate, drs . . . . lb.	...	.27½	.23	.27½	...	.23
GUMS						
Gum Aloes, Barbadoes . . . . lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts . . . . . . lb.	.14	.15	.10½	.15	.09	.10¾
White sorts, No. 1, bgs . . lb.	.29	.30	.27	.30	.25	.28
No. 2, bgs . . . . lb.	.27	.28	.25	.28	.24	.26
Powd, bbls . . . . lb.	.17	.18	.14	.18	.13	.14
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY . . . . lb.	.02½	.10½	.02½	.10½	.02½	.10½
California, f.o.b., NY, drs ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY . . . . lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases . . . . lb.	.17	.18	.17	.19	.15	.19
Copal, Congo, 112 lb bgs, clean, opaque . . . . lb.	...	.19¼	.18⅞	.19¼	.18½	.20
Dark amber . . . . lb.	...	.08¼	.06⅞	.08¼	.06⅞	.08
Light amber . . . . lb.	...	.13⅛	.10¼	.13⅛	.10¼	.14⅛
Copal, East India, 180 lb bgs Macassar pale bold . . . . . lb.	...	.13	...	.13	.12⅝	.14
Chips . . . . lb.	...	.06½	...	.06½	.06⅛	.06½
Dust . . . . lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs . . . . lb.	...	.11¼	...	.11¼	.10⅜	.11⅛
Singapore, Bold . . . . lb.	...	.15⅝	...	.15⅝	.15⅛	.16⅞
Chips . . . . lb.	...	.04¼	.04¾	.05	.04⅜	.05¼
Dust . . . . lb.	.03⅝	.04⅛	.03⅝	.04⅛	.03⅝	.04⅛
Nubs . . . . lb.	...	.10⅜	.10⅜	.10¾	.10	.11¼
Copal Manilla, 180-190 lb baskets, Loba A . . . . . lb.	...	.09¾	...	.09¾	.09¼	.13
Loba B . . . . lb.	...	.09¼	...	.09¼	.08⅞	.12
Loba C . . . . lb.	...	.08⅞	...	.08⅞	.08⅜	.11⅛
DBB . . . . lb.	...	.08⅜	.08	.08⅜	.07⅝	.08⅞
Dust . . . . lb.	...	.06⅛	.05¾	.06⅛	.05	.06⅛
MA sorts . . . . lb.	...	.07¼	.06¾	.07¼	.06¾	.07⅝
Copal Pontianak, 224 lb cases, bold genuine . . . . lb.	...	.16	.15½	.16	.14¼	.16
Chips . . . . lb.	...	.10¼	.09⅛	.11⅛	.07	.08½
Mixed . . . . lb.	...	.14	.13½	.14	.13¼	.13¾
Nubs . . . . lb.	...	.12⅞	.12¾	.13½	.10¼	.12
Split . . . . lb.	...	.15¼	.13½	.15¼	.12¾	.13
Dammar Batavia, 136 lb cases A . . . . lb.	...	.23½	...	.23½	.21⅛	.22¼
B . . . . lb.	...	.22⅛	...	.22⅛	.20⅜	.21½
C . . . . lb.	...	.18½	...	.18½	.16½	.17⅝
D . . . . lb.	...	.15¼	.15¼	.15⅝	.13⅝	.14⅜
A/D . . . . lb.	...	.17⅝	.17⅝	.18½	.15½	.17⅛
A/E . . . . lb.	...	.15¼	.14⅞	.15¼	.12⅞	.14½
E . . . . lb.	...	.07¾	.07½	.08⅛	.06¾	.07⅛
F . . . . lb.	...	.06¾	.06¼	.06¾	.05⅞	.06⅞
Singapore, No. 1 . . . . lb.	...	.18	.17⅛	.18	.16¼	.17½
No. 2 . . . . lb.	...	.15	.14⅛	.15	.13	.14¼
No. 3 . . . . lb.	...	.05¾	..	.05¾	.05¼	.05¾
Chips . . . . lb.	...	.10⅞	.10¼	.10⅞	.09¾	.09¾
Dust . . . . lb.	...	.05¾	.05¾	.06	.04¼	.05⅝
Seeds . . . . lb.	...	.08½	.07⅞	.08½	.06⅝	.07⅜
Elemi, cons . . . . lb.	.09⅜	.09½	.09⅜	.10¼	.09¾	.10¼
Ester . . . . lb.	.11½	.12	.11½	.12	.07⅝	.10
Gamboge, pipe, cases . . . . . lb.	.58	.59	.58	.59	.58	.59
Powd, bbls . . . . lb.	.65	.66	.65	.66	.65	.66
Ghatti, sol. bgs . . . . lb.	.11	.15	.11	.15	.11	.15
Karaya, powd, bbls, xxx . . lb.	.24	.25	.24	.25	.24	.25
xx . . . . lb.	.16	.17	.16	.17	.16	.17
No. 1 . . . . lb.	.09½	.10	.09½	.10	.09½	.10
No. 2 . . . . lb.	.08½	.09	.08½	.09	.08½	.09
Kauri, NY, San Francisco, Brown XXX, cases . . . . lb.	.60	.60½	.60	.60½	.60	.60½
BX . . . . lb.	...	.36	.33	.36	.33	.33½
B1 . . . . lb.	...	.26	.21	.26	.19	.21
B2 . . . . lb.	...	.21	.15½	.21	.14½	.15½
B3 . . . . lb.	...	.17½	.12	.17½	.12	.12½
Pale XXX . . . . lb.	.65	.65½	.65	.65½	.65	.65½
No. 1 . . . . lb.	...	.41	.40	.41	.40	.40½
No. 2 . . . . lb.	...	.24	.22	.24	.22	.22½
No. 3 . . . . lb.	...	.14¾	.15	.14¾	.15	.15½
Kino, tins . . . . lb.	1.60	1.70	.70	1.70	.70	.80
Mastic . . . . lb.	.57	.58	.57	.58	.56	.60½
Sandarac, prime quality, 200 lb bgs & 300 lb cks . . . lb.	.33	.35	.33	.35	.19½	.38
Senegal, picked bgs . . . . . . lb.	.22	.24	.20	.24	.20	.21
Sorts . . . . lb.	.12	.12¼	.09¾	.12¼	.09¾	.12½
Thus, bbls . . . . 280 lbs.	...	13.00	12.00	13.00	11.00	12.00
Strained . . . . 280 lbs.	...	13.00	12.00	13.00	11.00	12.00
Tragacanth, No. 1, cases . . lb.	3.00	3.25	2.40	3.25	1.20	2.50
No. 2 . . . . lb.	2.50	2.75	2.00	2.75	1.10	2.10
No. 3 . . . . lb.	2.45	2.70	1.95	2.70	.95	2.05
No. 4 . . . . lb.	2.40	2.65	1.85	2.65	.85	1.95
No. 5 . . . . lb.	2.25	2.50	1.65	2.50	.75	1.75
Yacca, bgs . . . . lb.	.03¼	.03¾	.03¼	.03¾	.03¼	.03¾
Helium, cyl (200 cu. ft.) cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Hemlock, 25%, 600 lb bbls, wks . . . . lb.	...	.03⅛	...	.03⅛	...	.02⅞
tks . . . . lb.	...	.02¾	...	.02¾	...	.02½

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Hexalene, 50 gal drs, wks lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks gal.	...	.10½	...	.10½	...	.12
Hexamethylenetetramine, powd, drs lb.	.35	.36	.35	.36	.35	.39
Hexyl Acetate, delv, drs lb.	...	.10	...	.10	.10	.12½
tks lb.	...	.09	...	.09	.09	.11½
Hoof Meal, f.o.b. Chicago unit	3.65	3.75	3.50	3.75	2.35	3.00
Hydrogen Peroxide, 100 vol, 140 lb cbys lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.15	.20	.15	.20	.17	.20

INDIGO

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Indigo, Bengal, bbls lb.	...	2.40	...	2.40	...	...
Synthetic, liquid lb.	.16½	.19	.16½	.19	.13	.14
Iodine, Resublimed, kgs lb.	1.50	1.60	1.50	1.60	1.50	1.75
Irish Moss, ord, bales lb.	.11	.12	.11	.12	.09	.10
Bleached, prime, bales lb.	.20	.21	.20	.21	.18	.19
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.						
Nitrate, coml, bbls 100 lb.	2.75	3.25	2.75	3.25	2.75	3.25
Isobutyl Carbinol (128-132°C) drs, wks lb.	.33	.34	.33	.34	.33	.34
tks, wks lb.	...	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt allowed lb.	...	.06½	...	.06½	.06	.07½
drs, frt allowed lb.	.07½	.08	.07½	.08	.07	.09
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown ton	60.00	70.00	60.00	70.00	60.00	70.00

LEAD ACETATE

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Lead Acetate, f.o.b. NY, bbls, White, broken lb.	...	.13½	.11½	.13½	.11	.11½
cryst, bbls lb.	...	.13½	.11½	.13½	.10½	.11½
gran, bbls lb.	...	.14¼	.12¼	.14¼	.11	.12¼
powd, bbls lb.	...	.14¼	.12¼	.14¼	.11¼	.12¼
Arsenate, East, drs lb.	...	.11½	.11	.11½	.09	.10
West, drs lb.	...	.12½	.11	.12½	.09	.09¾
Linoleate, solid, bbls lb.	...	.18	...	.18	.18	.26½
Metal, c-l, NY 100 lb.	6.95	7.05	6.00	7.05	4.50	6.00
Nitrate, 500 lb bbls, wks lb.	.11	.11½	.09	.11½	.09	.09½
Oleate, bbls lb.	.15	.16	.15	.16	.15	.16
Red, dry, 95% Pb_3O_4, delv lb.	...	.08½	.08½	.0945	.07	.085
97% Pb_3O_4, delv lb.	...	.09¼	.08¾	.09¾	.07¼	.08¾
98% Pb_3O_4, delv lb.	...	.09	.09	.10	.07½	.09
Resinate, precip, bbls lb.	...	.16½	.14	.16½	...	.14
Stearate, bbls lb.	.22	.23	.22	.23	.22	23
Titanate, bbls, c-l, f.o.b. wks, frt allowed lb.	...	.12	.10	.12	...	...
White, 500 lb bbls, wks lb.	...	.07½	.07¼	.09	.06½	.07¼
Basic sulfate, 500 lb bbls, wks lb.	...	.07	.06¾	.08¾	.06	.06½
Lime, chemical quicklime, f.o.b., wks, bulk ton	6.00	8.00	6.00	8.00	7.00	7.25
Hydrated, f.o.b., wks ton	8.00	12.00	8.00	12.00	8.50	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks gal.	...	.11	...	.11	...	.11
drs gal.	.13	.16	.13	.16	.13	.16
Linseed Meal, bgs ton	...	37.00	37.00	42.50	29.00	40.50
Litharge, coml, delv, bbls lb.	...	.07½	.07½	.08½	.06	.075
Lithopone, dom, ordinary, delv, bgs lb.	.04¼	.04½	.04¼	.04½	.04¼	.04¾
bbls lb.	.04½	.04¾	.04½	.04¾	.04½	.05
High strength, bgs lb.	.05¾	.06	.05¾	.06	.05¾	.06¼
bbls lb.	.06	.06¼	.06	.06¼	.06	.06½
Titanated, bgs lb.	.05¾	.06	.05¾	.06	.05¾	.06¼
bbls lb.	.06	.06¼	.06	.06¼	.06	.06½
Logwood, 51°, 600 lb bbls lb.	.08½	.10½	.08½	.10½	.06½	.10½
Solid, 50 lb boxes lb.	.13½	.17½	.13½	.17½	.13½	.17½
Sticks ton	24.00	25.00	24.00	25.00	24.00	26.00

MADDER

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Madder, Dutch lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks lb.	.06	.06½	.06	.06½	.06	.06½
Chloride flake, 375 lb drs, c-l, wks ton	39.00	42.00	39.00	42.00	36.00	42.00
Fluosilicate, crys, 400 lb bbls, wks lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls lb.	.36	.40	.36	.40	...	.42
Heavy, 250 lb bbls lb.	...	.50	...	.50	...	.50
Palmitate, bbls lb.	.33	nom.	.33	nom.	.23	.24
Silicofluoride, bbls lb.	.09½	.10½	.09½	.10½	...	...
Stearate, bbls lb.	.21	.24	.21	.24	.20	.24
Manganese acetate, drs lb.	...	.26½	.25½	.26½	...	...
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks lb.	.09	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l ton	...	47.50	...	47.50	...	47.50
Hydrate, bbls lb.	...	.32	...	.32	...	...
Linoleate, liq, drs lb.	.18	.19¼	.18	.19¼	...	...
solid, precip, bbls lb.	...	.19	.17½	.19	...	...
Resinate, fused, bbls lb.	.08¼	.08½	.08¼	.08½	...	...
precip, drs lb.	...	.12	...	.12	...	...
Sulfate, tech, anhyd, 90-95%, 550 lb drs lb.	.07	.07½	.07	.07½	...	...
Mangrove, 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African ton	26.00	27.00	26.00	27.00	25.50	27.00

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Mannitol, pure cryst, cs, wks lb.	...	1.48	...	1.48	1.48	1.60
Marble Flour, blk ....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride ....lb.	1.05	1.33	1.05	1.33	.81	1.20
Mercury metal ...76 lb. flasks	92.00	94.00	92.00	95.00	73.50	95.00
Meta-nitro-aniline ....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ....lb.	1.45	1.55	1.45	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls ....lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls ....lb.	.65	.67	.65	.67	.65	.69
Methanol, denat, grd, drs, c-l, frt all'd ....gal.	...	.46	.46	.53	...	...
tanks, frt all'd ......gal.	...	.40	.40	.48	...	...
contracts, frt all'd..gal.	...	.45	...	.45	...	...
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	...
tanks ....gal.	...	.33	...	.33	...	...
95%, tks ....gal.	...	.31	...	.31	...	...
97%, tks ....gal.	...	.32	...	.32	...	...
Methyl Acetate, dom, 98-100%, drs ....lb.	.16	.17½	.16	.17½	.11	.18⅓
Acetone, frt all'd, drs gal. *p*	.42	.48	.42	.58½	.45⅓	.68½
tks, frt allowed, drs gal. *p*	.36	.40	.36	.44½	.41	.48
Synthetic, frt all'd, east of Rock M., drs ....gal. *p*	.52½	.59½	.52½	.59½	.52⅓	.60
tks, frt all'd ....gal.	.48	.49½	.48	.49½	.48	.53
West of Rocky M., frt all'd, drs ..gal. *p*	.55½	.58	.55½	.58	.55⅓	.69
tks, frt all'd ..gal. *p*	...	.51	...	.51	.51	.63½
Anthraquinone ....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ......lb.	...	.10⅓	...	.10⅓	...	.10½
Chloride, 90 lb cyl .....lb.	.37	.43	.37	.43	...	.45
Ethyl Ketone, tks ......lb.	...	.07½	...	.07½	...	.07½
Formate, drs, frt allowed lb.	...	.39	...	.39	...	...
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt allowed lb.	...	.30	...	.30	...	...
Propyl carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ..lb.	35.00	...	35.00	...	35.00	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blackstrap, tks, f.o.b. NY ....gal.	...	.07¼	...	.07¼	.07	.08¼
Monoamylamine, c-l, drs, wks lb.	.52	1.00	.52	1.00	...	1.00
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.30	...	.30	...	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l ..lb.	...	.65	...	.65	...	...
Monomethylparaminosulfate, 100 lb drs ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls..lb.	...	.04¼	...	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.06	.06¼
J1 bgs ....ton	...	27.50	26.50	28.00	22.00	26.50
J2 bgs ....ton	...	19.00	19.00	20.75	14.25	16.75
R2 bgs ....ton	...	18.75	18.75	20.25	14.00	16.25
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ....gal.	...	.31	...	.31	...	.31
drs, c-l ....gal.	...	.36	...	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks ....lb.	2.50	2.55	2.50	3.00	2.75	4.50
Imported, cif, bgs ....lb.	2.50	2.55	2.50	3.00	...	...
Balls, flakes, pks ......lb.	...	.08	...	.08	.07¼	.08
Balls, ref'd, bbls, wks ..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Dyestuffs, bgs, bbls, wks lb.	...	.07¼	...	.07¼	.06	.07
Flakes, ref'd, bbls, wks..lb.	...	.07¼	...	.07¼	.06¾	.07¼
Nickel Carbonate, bbls....lb.	...	.36	...	.36	...	.36
Chloride, bbls ....lb.	.18	.19	.18	.19	.18	.19
Metal ingot ....lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY..lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ....lb.	...	.76	...	.76	.75	1.17
Nitre Cake, blk ....ton	...	16.00	...	16.00	12.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks ....lb.	.08	.10	.08	.10	.08	.11
tks ....lb.	...	.07½	...	.07½	...	.08½
Nitrocellulose, c-l-l c-l, wks lb.	.22	.29	.26	.29	.26	.34
Nitrogenous Mat'l, bgs, imp unit	...	3.55	...	3.55	2.00	3.10
dom, Eastern wks ....unit	...	4.25	3.60	4.25	1.90	3.00
dom, Western wks ....unit	...	3.75	3.40	3.75	1.85	2.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs .....lb.	.20	.22	.20	.22	.16	.18
Chinese, bgs ....lb.	.20	.22	.20	.22	.19	.20
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03⅛	...	.03⅛	...	.03½
tks ....lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	.16	.17	.16	.17	...	.15
Orange-Mineral, 1100 lb cks NY ....lb.	...	.11½	.11¼	.12¾	.10	.11¼
Orthoaminophenol, 50 lb kgs.lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.82	.84
Orthochlorophenol, drs ....lb.	.35	.75	.35	.75	.50	.65
Orthocresol, drs, wks .....lb.	.13½	.14½	.13½	.14½	.13	.15
Orthodichlorobenzene, 1000 lb drs ....lb.	.06	.07	.05	.07	.05	.11½

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Orthonitrochlorobenzene, 1200 lb drs, wks ... lb.	.28	.29	.28	.29	.28	.29
Orthonitroparachlorphenol, tins ... lb.	.70	.75	.70	.75	.70	.75
Orthonitrophenol, 350 lb drs ... lb.	.85	.90	.85	.90	.52	.80
Orthonitrotoluene, 1000 lb drs, wks ... lb.	.07	.10	.07	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l ... lb.	.14	.15	.14	.15	.14	.15
Osage Orange, cryst, bbls ... lb.	.17	.25	.17	.25	.17	.25
51° liquid ... lb.	.07	.08	.07	.08	.07	.07¼
Paraffin, rfd, 200 lb cs slabs						
122-127° M P ... lb.	.0445	.04½	.0445	.04½	.0445	.04½
128-132° M P ... lb.	.04¾	.049	.04¾	.049	.04¾	.049
133-137° M P ... lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
Para aldehyde, 110-55 gal drs ... lb.	.16	.18	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ... lb.	.30	.45	.30	.45	.50	.65
Dichlorobenzene, 200 lb drs, wks ... lb.	.16	.20	.16	.20	.16	.20
Formaldehyde, drs, wks ... lb.	.34	.35	.34	.35	.34	.39
Nitroacetanilid, 300 lb bbls ... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ... lb.	.45	.47	.45	.47	.47	.51
Nitrochlorobenzene, 1200 lb drs, wks ... lb.	.23½	.24	.23½	.24	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.45	.50
Nitrosodimethylaniline, 120 lb bbls ... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	.36	.37
Para Tertiary amyl phenol, wks, drs, c-l ... lb.	...	.26	...	.26	.26	.50
Phenylenedamine, 350 lb bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ... lb.	.70	.75	.70	.75	.70	.75
tks, wks ... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ... lb.	.56	.58	.56	.58	.56	.60
Paris Green, dealer, drs, frt E. of Cleveland ... lb.	.22	.24	.22	.24	...	.24
Pentane, normal, 28-38° C, group 3, tks ... gal.	...	.09½	...	.09½	.09	.09½
drs, group 3 ... gal.	.12½	.16	.12½	.16	.10	.16
Perchlorethylene, 100 lb drs, frt allowed ... lb.	...	.10½	...	.10½	.10½	.15
Petrolatum, dark amber, bbls ... lb.	.02⅞	.03	.02⅝	.03	.02⅝	.02⅞
Light, bbls ... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03⅜
Medium, bbls ... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls ... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls ... lb.	.02⅝	.03¾	.02⅛	.03¾	.02⅛	.02⅝
White, lily, bbls ... lb.	.06	.06¼	.06	.06¼	.06	.06¼
White, snow, bbls ... lb.	.07	.07¼	.07	.07¼	.07	.07¼
Petroleum Ether, 30-60°, group, 3 tks ... gal.	...	.13	...	.13	...	.13
drs, group 3 ... gal.	.15	.16	.15	.16	.15	.16

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ... gal.	.07⅜	.07½	.07⅜	.07½	.07⅜	.07½
Bayonne, tks, wks ... gal.	...	.10	.09½	.10	.09	.09½
West Coast, tks ... gal.	...	.15	...	.15	...	.15
Hydrogenated, naphthas, frt allowed East, tks ... gal.	...	.16	...	.16	.15	.16
No. 2, tks ... gal.	...	.18	...	.18	...	.18
No. 3, tks ... gal.	...	.16	...	.16	...	.15
No. 4, tks ... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks Bayonne ... gal.	.12	.12½	.12	.12½	.12	.12½
Group 3, tks ... gal.	.08⅜	.08½	.08⅜	.08½	.07⅞	.08½
Naphtha, V.M.P., East, tks, wks ... gal.	...	.10½	.10	.10½	.09	.10
Group 3, tks, wks ... gal.	.07⅜	.07½	.07⅜	.07½	.07⅜	.07½
Petroleum thinner, East, tks, wks ... gal.	.09½	.10	.09	.10	.09	.09½
Group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.06⅝	.06⅜	.06⅝
Rubber Solvents, stand grd, East, tks, wks ... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	.07⅜	.07½	.07⅜	.07½	.07⅜	.07½
Stoddard Solvent, East, tks, wks ... gal.	...	.10	.09½	.10	.09	.09½
Group 3, tks, wks ... gal.	.06⅞	.07	.06⅞	.07	.06⅞	.07
Phenol, 250-100 lb drs ... lb.	.13¼	.15	.13¼	.15	.13¼	.15
tks, wks ... lb.	...	.12¾	...	.12¾	...	...
Phenyl-Alpha-Naphthylamine, 100 lb kgs ... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ... lb.	...	.17	.16	.17	...	.16
Phenylhydrazine Hydrochloride, com ... lb.	2.30	6.50	2.30	6.50	2.90	3.00
Phloroglucinol, tech, tins ... lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tins ... lb.	20.00	22.00	20.00	22.00	20.00	22.00

Current

Phosphate Rock
Rosin Oil

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis ton	...	1.85	...	1.85	...	1.85
70% basis ....ton	...	2.35	...	2.35	...	2.35
72% basis ....ton	...	2.85	...	2.85	...	2.85
75-74% basis ....ton	...	3.85	...	3.85	...	3.85
75% basis ....ton	...	5.50	...	5.50	...	4.35
Tennessee, 72% basis..ton	...	4.50	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl ....lb.	.16	.20	.16	.20	.16	.20
Red, 110 lb cases ......lb.	.40	.44	.40	.44	.40	.45
Sesquisulfide, 100 lb cs..lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl ....lb.	.15	.18	.15	.20	.16	.20
Yellow, 110 lb cs, wks..lb.	.24	.30	.24	.33	.28	.33
Phthalic Anhydride, 100 lb drs, wks ....lb.	.14½	nom.	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls						
Destructive dist ....lb.	.49	.50	.49	.50	.44	.50
Steam dist wat wh bbls gal.	.64	.65	.64	.65	.64	.65
tks ....gal.	...	.59	...	.59	...	.59
Straw color, bbls ......gal.	...	.59	...	.59	...	.59
tks ....gal.	...	.54	...	.54	...	.54
Pitch Hardwood, wks ....ton	16.00	16.50	15.00	16.50	...	15.00
Coaltar, bbls, wks .....ton	...	19.00	...	19.00	...	19.00
Burgundy, dom, bbls, wks lb.	.05½	.06½	.03½	.06½	...	.03½
Imported ....lb.	.11½	.12½	.11	.13	.11	.13
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls ....bbl.	6.00	6.50	6.00	6.50	4.00	5.25
Stearin, drs ....lb.	.03	.04½	.03	.04½	.03	.04½
Platinum, ref'd ....oz.	56.00	66.00	45.00	68.00	34.50	64.00
POTASH						
Potash, Caustic, wks, sol..lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
flake ....lb.	.07	.07⅜	.07	.07⅜	.07	.07⅜
Liquid, tks ....lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, imported						
20% basis, blk ......ton	...	12.00	...	12.00	11.00	12.00
30% basis, blk .....unit	...	.55	...	...	...	...
Potassium Abietate, bbls ..lb.	...	.13	...	...	...	...
Acetate ....lb.	.26	.28	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls ....lb.	.09	.18	.09	.18	.09	.18
Bichromate Crystals, 725 lb cks* ....lb.	.08½	.09	.08½	.09	.08½	.09
Binoxalate, 300 lb bbls..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ...lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks ....lb.	.06½	.07	.06½	.07	.06½	.07½
liquid, tks ....lb.	...	.02¾	...	.02¾	.02¾	.02⅞
drs, wks ....lb.	.02⅞	.03½	.02⅞	.03½	.02⅞	.03¼
Chlorate crys, 112 lb kgs, wks ....lb.	.09¼	.09½	.09¼	.09½	.09¼	.09½
gran, kgs ....lb.	.12	.13	.12	.13	.12	.13
powd, kgs ....lb.	.08½	.08¾	.08½	.08¾	.08	.08¼
Chloride, crys, bbls ....lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs ....lb.	.28	.29	.28	.29	.23	.28
Cyanide, 110 lb cases ..lb.	.55	.57½	.55	.57½	.55	.57½
Iodide, 75 lb bbls ......lb.	.93	1.00	.93	1.15	1.10	1.25
Metabisulfite, 300 lb bbls lb.	.11	.12	.11	.15	.13¾	.15
Muriate, bgs, dom, blk unit	...	.50	...	.50	.45	.50
Oxalate, bbls ....lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks ...lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.18½	.19½	.18½	.19½	.18½	.19½
Prussiate, red, bbls .....lb.	.35	.37	.35	.37	.35	.38½
Yellow, bbls ....lb.	.15	.16	.15	.18	.16	.19
Sulfate, 90% basis, bgs ton	...	36.25	...	36.25	33.75	36.25
Titanium Oxalate, 200 lb bbls ....lb.	.33	.35	.33	.35	.32	.35
Pot & Mag Sulfate, 48% basis bgs ....ton	...	24.75	...	24.75	22.25	24.75
Propane, group 3, tks ....lb.	.03	.04⅜	.03	.04⅜	.03	.04⅜
Putty, coml, tubs .....100 lb.	...	2.90	2.90	3.00	2.75	3.00
Linseed Oil, kgs ...100 lb.	...	4.65	4.65	4.75	4.50	4.75
Pyrethrum, conc liq:						
2.4% pyretherins, drs, frt allowed ....gal.	4.25	4.50	4.15	4.50	...	...
3.6% pyretherins, drs, frt allowed ....gal.	6.37	6.75	6.10	6.75	...	...
Flowers, coarse, Japan, bgs ....lb.	...	.14	.12¾	.12	...	...
Fine powd, bbls ......lb.	...	.17¾	.14	.17¾	...	...
Pyridine, denat, 50 gal drs gal.	...	1.30	...	1.30	...	1.30
Pyrites, Spanish cif Atlantic ports, blk ....unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.75	2.15	2.75	2.15	2.75
Quebracho, 35% liq tks ...lb.	...	.02⅞	...	.02⅞	.02⅝	.02⅞
450 lb bbls, c-l ....lb.	...	.04	.03⅞	.04	.03⅝	.03⅞
Solid, 63%, 100 lb bales cif ....lb.	...	.04	.03⅞	.04	.03⅝	.03⅞
Clarified, 64%, bales..lb.	...	.04¼	.04¼	.04⅜	.03⅞	.04⅜
Quercitron, 51 deg liq, 450 lb bbls ....lb.	.06	.06½	.06	.06½	.06	.06½
Solid, drs ....lb.	.10	.12	.10	.12	.10	.12
R SALT						
R Salt, 250 lb bbls, wks ..lb.	.52	.55	.52	.55	.52	.57
Resorcinol tech, cans .....lb.	.75	.80	.75	.80	.75	.80
Rochelle Salt, cryst ......lb.	.14½	.15	.14½	.15	.14	.15
Powd, bbls ....lb.	.13½	.14	.13½	.14	.13	.14
Rosin Oil, bbls, first run gal.	.66	.68	.66	.73	.38	.71
Second run ....gal.	.68	.70	.68	.75	.43	.73
Third run, drs ....gal.	.72	.74	.72	.79	.49	.77

* Spot price is ⅛c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:						
B	...	8.30	8.30	10.00	4.45	10.95
D	...	8.35	8.35	10.35	4.95	10.95
E	...	8.80	8.80	10.25	5.15	10.95
F	...	9.30	9.30	10.80	5.40	10.95
G	...	9.30	9.30	10.85	5.50	10.95
H	...	9.30	9.30	10.85	5.60	10.95
I	...	9.32½	9.32½	10.90	5.70	10.95
K	...	9.32½	9.32½	10.90	5.55	10.95
M	...	9.32½	9.32½	11.00	5.60	10.95
N	...	9.32½	9.32½	11.05	5.70	11.00
WG	...	9.35	9.35	11.75	5.85	11.00
WW	...	10.00	10.00	13.75	5.90	12.05
Rosins, Gum, Savannah (280 lb unit):						
B	...	7.05	7.05	8.75	3.15	9.70
D	...	7.10	7.10	9.00	3.75	9.70
E	...	7.55	7.55	9.10	3.90	9.70
F	...	8.05	8.05	9.55	4.10	9.70
G	...	8.05	8.05	9.60	4.20	9.70
H	...	8.05	8.05	9.60	4.30	9.70
I	...	8.07½	8.07½	9.65	4.35	9.70
K	...	8.07½	8.07½	9.65	4.30	9.70
M	...	8.07½	8.07½	9.75	4.35	9.70
N	...	8.07½	8.07½	9.75	4.45	9.75
WG	...	8.10	8.10	10.50	4.45	9.75
WW	...	8.75	8.75	12.50	4.55	10.80
X	...	8.75	8.75	12.50	4.55	10.80
Rosin, Wood, c-l, FF grade, NY	9.16	10.25	9.16	10.72	6.10	10.52
Rotten Stone, bgs mines . . ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls . . . lb.	...	.12	...	...	...	...
Powdered, bbls . . . lb.	.08½	.10	...	...	...	...
SAGO FLOUR						
Sago Flour, 150 lb bgs . . . lb.	.02¾	.03¾	.02¾	.03¾	.02¾	.03¾
Sal Soda, bbls, wks . . . 100 lb.	...	1.15	...	1.15	1.15	1.30
Salt Cake, 94-96%, c-l, wks ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks . . . ton	11.00	12.00	11.00	12.00	11.00	13.00
Saltpetre, gran, 450-500 lb bbls . . . lb.	.06	.064	.06	.064	.059	.06¼
Cryst, bbls . . . lb.	.07	.074	.07	.074	.069	.08
Powd, bbls . . . lb.	.07	.074	.07	.074	.069	.07⅞
Satin, White, 550 lb bbls . . lb.	...	.01½	...	.01½	...	.01½
Schaeffer's Salt, kgs . . . lb.	.46	.48	.46	.48	.46	.50
Shellac, Bone dry, bbls . . lb. r	.21	.22	.21	.22	.17½	.26½
Garnet, bgs . . . lb.	.16	.17	.16	.17	.16	.20
Superfine, bgs . . . lb. s	.15	.18½	.15	.18½	.14½	.18½
T. N., bgs . . . lb. s	.14	.14½	.14	.14½	.13½	.16
Silver Nitrate, vials . . . oz.	...	.32⅝	.32⅝	.35½	.32 5/16	.34⅞
Slate Flour, bgs, wks . . . ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks . . . 100 lb.	...	1.25	...	1.25	...	1.25
58% light, bgs . . . 100 lb.	...	1.23	...	1.23	...	1.23
blk . . . 100 lb.	...	1.05	...	1.05	...	1.05
paper bgs . . . 100 lb.	...	1.20	...	1.20	...	1.20
bbls . . . 100 lb.	...	1.50	...	1.50	...	1.50
Caustic, 76% grnd & flake, drs . . . 100 lb.	...	3.00	...	3.00	...	3.00
76% solid, drs . . . 100 lb.	...	2.60	...	2.60	...	2.60
Liquid sellers, tks . . 100 lb.	...	2.25	...	2.25	...	2.25
Sodium Abietate, drs . . . lb.	...	.13	.08	.13	...	.08
Acetate, tech, 450 lb bbls, wks . . . lb.	.04¼	.05	.04¼	.05	.04½	.05
Alignate, drs . . . lb.	...	.69	.64	.69	...	.64
Antimoniate, bbls . . . lb.	.15¾	.16¼	.13¾	.16¼	.12	.14
Arsenate, drs . . . lb.	.08	.10	.08	.11½	...	.10½
Arsenite, liq, drs . . . gal.	.30	.33	.33	.40	.40	.75
Benzoate, USP, kgs . . . lb.	.46	.48	.46	.48	.46	.48
Bicarb, 400 lb bbl, wks 100 lb.	...	1.75	...	1.75	1.75	1.85
Bichromate, 500 lb cks, wks* . . . lb.	.06½	.07	.06½	.07	.06½	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	...	...	...	...
Chlorate, bgs, wks . . . lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks . . . lb.	.16½	.17½	.15½	.17½	.15½	.17½
Fluoride, 90%, 300 lb bbls, wks . . . lb.	.07½	.08¼	.07½	.08¼	.07¼	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks . . . lb.	.16	.17	.16	.17	.17	.19
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.50	3.00	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks . . . 100 lb.	2.40	2.75	2.40	2.75	2.40	2.75
Iodide . . . lb.	1.90	1.95	1.90	1.95	1.90	2.05
Metal, drs, 280 lbs . . . lb.	...	.19	...	.19	...	...
Metanilate, 150 lb bbls . lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks . . . 100 lb.	...	2.15	...	2.15	2.15	3.00
cryst, bbls, c-l, wks 100 lb.	...	2.75	...	2.75	2.75	3.25
Monohydrate, bbls . . . lb.	..	.023	...	.023	...	.023
Naphthenate, drs . . . lb.	.12	.19	.09	.19	...	.09
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY . . . ton	...	26.80	...	26.80	24.80	26.80
100 lb bgs . . . ton	...	27.50	...	27.50	25.50	27.50
Bulk . . . ton	...	25.50	...	25.50	23.50	25.50

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Sodium (continued):						
Nitrite, 500 lb bbls .....lb.	.07	.10	.07	.10	.07	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks..lb.	.25	.27	.25	.27	.25	.27
Perborate, drs, 400 lbs..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.18
Peroxide, bbls, 400 lb...lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	1.90	...	1.90	1.95	2.30
bgs, wks ....100 lb.	...	1.70	...	1.70	1.75	2.10
Tri-sodium, tech, 325 lb bbls, wks ....100 lb.	...	2.05	...	2.05	1.95	2.30
bgs, wks ....100 lb.	...	1.85	...	1.85	1.75	2.10
Picramate, 160 lb kgs ...lb.	.65	.67	.65	.67	.65	.69
Prussiate, Yellow, 350 lb bbl, wks ....lb.	.10	.11½	.10	.11½	.10	.12
Pyrophosphate, anhyd, 100 lb bbls ....lb.	...	.10	...	.10	.10	.132
Sesquisilicate, drs, c-l, wks ....100 lbs.	...	3.00	...	...	...	...
Silicate, 60°, 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks ....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY ....lb.	.06½	.07	.06½	.07	.05¼	.07¼
Stannate, 100 lb drs ....lb.	.36½	.39½	.33	.44	.28½	.37½
Stearate, bbls ....lb.	...	.19	.19	.20	.20	.26
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs* c-l, wks ....100 lb. ‡	1.45	1.90	1.45	1.90	1.30	1.90
Sulfide, 80% cryst, 440 lb bbls, wks ....lb.	...	.02¼	...	.02¼	...	.02¼
62% solid, 650 lb drs, c-l, wks ....lb.	...	.02	...	.02	...	.03
Sulfite, cryst, 400 lb bbls, wks ....lb.	.023	.02½	.023	.02½	.023	.02½
Sulfocyanide, drs ......lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	...
Tungstate, tech, crys, kgs lb.	...	nom.	.85	.90	.85	.90
Sorbitol, com., drs, basis content, wks ....lb.	...	.25	...	.25	...	...
Spruce Extract, ord, tks...lb.	...	.01	...	.01	...	.01
Ordinary, bbls ....lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, tks...lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs ....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	4.23	4.43	3.78	4.43	2.99	4.30
Powd, 140 lb bgs ...100 lb.	4.33	4.53	3.88	4.53	3.90	4.54
Potato, 200 lb bgs .....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Imp, bgs ....lb.	.05	.06	.05	.06	.05	.06
Rice, 200 lb bbls ......lb.	...	.07¼	...	.07¼	...	.07¼
Wheat, thick, bgs ......lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
Strontium carbonate, 600 lb bbls, wks ....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.08¾	.09½
Sucrose octa-acetate, den, grd, bbls, wks ....lb.	.45	...	.45	...	.45	...
tech, bbls, wks ....lb.	.40	...	.40	...	.40	...
Sulfur, crude, f.o.b. mines. ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.65	2.35	1.65	2.35	1.60	2.35
bbls ....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls ....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.85	3.00	2.85	3.00	2.40	3.00
Superfine, bgs ......100 lb.	2.65	2.80	2.65	2.80	2.20	2.80
bbls ....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs ....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls ....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs ....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls ....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks ....lb.	.02½	.03½	...	...	...	...
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.06½	.08½
Multiple units, wks ....lb.	.04½	.07	.04½	.07	.05½	.06
tks, wks ....lb.	.04	.05	.04	.05	.04½	.04¾
Refrigeration, cyl, wks ..lb.	.15	.17	.15	.17	.10	.13
Multiple units, wks ....lb.	.07½	.10	.07½	.10	.07	.09¼
Sulfuryl Chloride ....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ......ton	60.00	65.00	60.00	65.00	52.00	60.00
Extract, 42°, bbls ......lb.	...	.05¼	...	.05¼	...	...
Superphosphate, 16% bulk, wks ....ton	...	8.50	8.25	8.50	...	...
Run of pile ....ton	...	8.00	...	8.00	...	...
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ......ton	...	.70	...	.70	...	...
Talc. Crude, 100 lb bgs, NY ton	13.00	15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00	16.00	14.00	16.00	14.00	18.00
French, 220 lb bgs, NY ton	23.00	30.00	23.00	30.00	22.00	30.00
Ref'd, white, bgs, NY ton	45.00	60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00	62.00	60.00	62.00	60.00	75.00
Ref'd, white, bgs, NY ton	65.00	70.00	65.00	70.00	65.00	80.00
Tankage Grd, NY .....unit ᵘ	...	3.90	3.90	4.40	2.65	4.25
Ungrd ....unit ᵘ	...	3.90	3.90	4.35	2.40	4.25
Fert grade, f.ob. Chgo unit ᵘ	...	3.75	3.75	4.00	2.40	4.00
South American cif. .unit ᵘ	...	4.00	4.00	4.25	2.70	3.90
Tapioca Flour, high grade, bgs ....lb.	.03½	.05½	.03½	.05½	.03½	.05½
Tar Acid Oil, 15%, drs ..gal.	.21	.24½	.21	.24½	.21	.24
25%, drs ....gal.	.24½	.27½	.24½	.27½	.24	.27½
Tar, pine, delv, drs .....gal.	...	.26	...	.26	.25	.26
tks, delv, E. cities ....gal.	...	.20	...	.20	...	.20
Tartar Emetic, tech, bbls..lb.	.26¾	.27	.24¾	.27	.24¾	.25
USP, bbls ....lb.	.32	.32½	.30	.32½	.28	.30½
Terpineol, den grd, drs ...lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.14¾
tks ....lb.	.13	.14	.13	.14	.13	.14

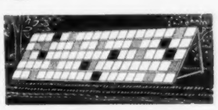
‡ Bags 15c lower; ᵘ + 10; * Bbls. are 20c higher.

	Current Market		1937 Low	1937 High	1936 Low	1936 High
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachloroethylene, drs, tech lb.	...	.10½	...	.10½	...	...
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.20	.25
Tin, crystals, 500 lb bbls, wks lb.	.40½	.41	.37½	.46	.35	.39½
Metal, NY lb.	...	.57¼	.49⅞	.66	.40½	.52½
Oxide, 300 lb bbls, wks lb.	.63	.66	.55	.59	.47	.57
Tetrachloride, 100 lb drs, wks lb.	...	.29½	.25½	.32	.21¼	.26¾
Titanium Dioxide, 300 lb bbls lb.	.16¼	.17	.16¼	.17	.16¼	.19¼
Barium Pigment, bbls lb.	.06	.06¼	.06	.06¼	.05¾	.06½
Calcium Pigment, bbls lb.	.06	.06¼	.06	.06¼	.05¾	.06½
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.27	.28
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	...	.35
8000 gal tks, frt allowed gal.	...	.30	...	.30	...	.30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75	.80
Para, red, bbls lb.	...	.75	...	.75	...	.75
Toluidine, bgs lb.	...	1.35	...	1.35	...	1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	.32	.36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	...	...
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	...	1.25
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	...	...
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	...	...
Trichlorethylene, 600 lb drs, frt allowed E. Rocky Mts lb.	.089	.094	.089	.094	.089	.094
Tricresyl phosphate, tech, drs lb.	...	.23	.22½	.25	.19	.26
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.30	.26	.30
tks, wks lb.	...	.20	.20	.25	...	.25
Triethylene glycol, drs, wks lb.	...	.26	...	...	...	...
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	...	...	...
Stearate, bbls lb.	...	.30	...	...	...	...
Trimethylamine, c-l, drs, frt allowed E. Mississippi lb.	...	1.00	...	1.00	...	...
Triphenylguanidine lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs lb.	.34	.36	...	...	...	...
Tripoli, airfloated, bgs, wks ton	25.00	30.00	25.00	30.00	27.50	30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.40¾	.40¾	.47	.40½	.50
Savannah, bbls gal.	...	.35¾	.35¾	.42	.35½	.45
Jacksonville, bbls gal.	..	.35¾	.35¾	.41	.35¼	.44½
Wood Steam dist, bbls, c-l, NY gal.	...	.39	.39	.44	.38	.47
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½	.17
Fert grade, bgs, c.i.f. ton						
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00	110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00	110.00
Urea Ammonia liq 55% NH_3, tks unit	...	1.04	...	1.04	...	.96
Valonia beard, 42%, tannin bgs ton	...	49.00	35.00	49.00	46.00	64.50
Cups, 32% tannin, bgs ton	32.50	34.50	31.50	36.00	34.00	42.00
Vanilin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	3.65	...	3.65	3.65	3.75
Ex-guaiacol lb.	...	3.55	.	3.55	3.55	3.65
Vermillion, English, kgs lb.	1.72	1.82	1.72	1.82	1.52	1.85
Wattle Bark, bgs ton	33.50	34.50	31.00	32.00	26.50	32.00
Extract, 60°, tks, bbls lb.	...	.04⅛	.03⅝	.04⅛	...	.03⅝
WAXES						
Wax, Bayberry, bgs lb.	.17	.17½	.16½	.17½	.16½	.20
Bees, bleached, white 500 lb slabs, cases lb.	.39	.45	.38	.45	.34	.40
Yellow, African, bgs lb.	.29½	.30	.28½	.30	.24	.27
Brazilian, bgs lb.	.32	.34	.33	.34	.25	.29½
Chilean, bgs lb.	.32	.34	.30	.34	.25	.29½
Refined, 500 lb slabs, cases lb.	.34	.38	.29½	.38	.28	.32
Candelilla, bgs lb.	.15	.16	.15	.16½	.14	.17½
Carnauba, No. 1, yellow, bgs lb.	.45½	.47	.45	.47	.43½	.48
No. 2, yellow, bgs lb.	.44	.44½	.43½	.45	.42	.46
No. 2, N. C., bgs lb.	.40	.41	.38	.41	.38	.40
No. 3, Chalky, bgs lb.	.35	.36½	.34½	.36½	.33½	.38
No. 3, N. C., bgs lb.	.36¼	.39¾	.35	.37¾	.34	.41
Ceresin, dom, bgs lb.	.08½	.12	.08	.12	.08	.11
Japan, 224 lb cases lb.	.10	.10½	.10	.11	.08	.10½
Montan, crude, bgs lb.	.11	.12	.11	.12	.10¾	.11¾
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.22	.24
Cakes, cases lb.	.24	.25	.24	.25	.23	.25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	...	15.00
Gilders, bgs, c-l, wks ton	..	15.00	...	15.00	11.50	15.00
Wood Flour, c-l, bgs ton	20.00	30.00	18.00	30.00	18.00	30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.33	...	.33	...	.33
Coml, tks, wks, frt all'd gal.	...	.30	...	.30	...	.30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.36	.37
Zinc, Carbonate tech, bbls, NY lb.	.14	.15	.12	.15	.09	.11
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½	.05¾
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.00	...	2.00	...	2.00
Cyanide, 100 lb drs lb.	.36	.38	.36	.38	.36	.38
Zinc Dust, 500 lb bbls, c-l, delv lb.	...	.0860	.079	.094	.068	.0755
Metal, high grade slabs, c-l, NY 100 lb.	...	7.10	6.35	7.85	...	5.825
E. St. Louis 100 lb.	...	6.75	6.00	7.50	4.80	5.45
Oxide, Amer, bgs, wks lb.	.06	.06¼	.05¼	.06½	.05	.05½
French, 300 lb bbls, wks lb.	.06	.06¼	.05½	.07	.05½	.07
Palmitate, bbls lb.	.23	.25	.23	.25	.22	.23
Resinate, fused, pale, bbls lb.	...	.10	.09	.10	.05¾	.10
Stearate, 50 lb bbls lb.	.20	.23	.20	.23	.19	.23

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Zinc Sulfate, crys, 400 lb bbl, wks	lb.	...	.033	.028	.033	.028	.033
Flake, bbls	lb.	...	.0375	.032	.0375	.032	.035
Sulfide, 500 lb bbls, delv	lb.	.09¼	.09¾	.09¼	.09¾	.09¼	.11¾
bgs, delv	lb.	.09	.09½	.09	.09½	.09	.11½
Sulfocarbolate, 100 lb kgs	lb.	.24	.26	.24	.26	.24	.25
Zirconium Oxide, crude, 73-75% grd, bbls, wks	ton	75.00	100.00	...	...	...	...
kgs, wks	lb.	.04¼	.04½	...	...	...	...

Oils and Fats

		Current Market		1937 Low	1937 High	1936 Low	1936 High
Babassu, tks, futures	lb.	...	.10½	.10½	.11¼	...	...
Castor, No. 3, 400 lb bbls	lb.	.10¼	.10¾	.10¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls	lb.	.12¼	.13	.12¼	.13	.12¼	.13
China Wood, drs, spot NY	lb.	.14½	.14¾	.14½	.14¾	.13	.19¼
Tks, spot NY	lb.	.138	.14	.138	.148	.125	.19
Coast, tks	lb.	...	nom.	.133	.146	.127	.18
Coconut, edible, bbls NY	lb.	...	.13½	.13½	.15	.09¼	.14¼
Manila, tks, NY	lb.	.07½	.07¾	.07½	.09½	.04⅛	.07
Tks, Pacific Coast	lb.	.07¼	.07½	.07¼	.08⅞	.03⅞	.08½
Cod, Newfoundland, 50 gal bbls	gal.	.52	nom.	.51	.52	.40	.48½
Copra, bgs, NY	lb.	.0450	nom.	.0450	.055	.0320	.0535
Corn, crude, tks, mills	lb.	.10	.10¼	.10	.10¾	.08	.10½
Refd, 375 lb bbls, NY	lb.	.12¾	.13¼	.12¾	.13¼	.10¾	.13
Cottonseed, see Oils and Fats News Section.							
Degras, American, 50 gal bbls. NY	lb.	...	.08	.07¾	.08	.05¼	.08
English, bbls, NY	lb.	...	.08	.07¾	.08	.04	.08
Greases, Yellow	lb.	.08⅜	.08⅝	.08⅜	.09	.03⅜	.08¼
White, choice bbls, NY	lb.	.08¾	.09¾	.08¾	.10¼	.04⅛	.08¾
Herring, Coast, tks	gal.	...	nom.	...	nom.	...	.31
Lard Oil, edible, prime	lb.	...	.16	.16	.16¾	.12¾	.16¼
Extra, bbls	lb.	...	.13¼	.13¼	.13½	.09½	.13
Extra, No. 1, bbls	lb.	...	.13¼	.13	.13½	.07¾	.12¼
Linseed, Raw less than 5 bbl lots	lb.	...	.121	.107	.121	.104	.117
bbls, c-l, spot	lb.	...	.113	.099	.113	.096	.103
Tks	lb.	...	.107	.093	.107	.086	.097
Menhaden, tks, Baltimore	gal.	...	.43½	.37	.43½	.25	.36
Refined, alkali, drs	lb.	.096	.096	.09	.096	.066	.084
Tks	lb.	...	.09	.084	.09	.062	.078
Kettle bodied, drs	lb.	...	.106	.10	.106	.08	.096
Light pressed, drs	lb.	.09	.091	.084	.091	.06	.078
Tks	lb.	...	.084	.078	.084	.056	.072
Neatsfoot, CT, 20°, bbls, NY	lb.	...	.18¼	.17½	.18¼	.16	.17
Extra, bbls, NY	lb.	...	.13½	.13¼	.13¾	.08	.12½
Pure, bbls, NY	lb.	...	.14	.14	.14¼	.11½	.12¾
Oiticica, bbls	lb.	.11¾	.12	.11½	.12	.10	.15½
Oleo, No. 1, bbls, NY	lb.	...	.12¾	.12¾	.14½	.09¼	.14
No. 2, bbls, NY	lb.	...	.12¼	.12¼	.14	.08¾	.13½
Olive, denat, bbls, NY	gal.	1.60	nom.	1.60	1.65	.73	1.60
Edible, bbls, NY	gal.	2.50	nom.	2.20	2.50	1.60	2.25
Foots, bbls, NY	lb.	.11½	nom.	.11½	.12½	.08	.10⅜
Palm, Kernel, bulk	lb.	...	.06⅜	.06⅜	.08⅛	.04¾	.083
Niger, cks	lb.	...	.07	.06¾	.07¼	.04	.06½
Sumatra, tks	lb.	...	.05⅝	.05⅝	.06½	.03¾	.06½
Peanut, crude, bbls, NY	lb.	.10⅛	nom.	.10¼	.10⅝	.08	.10½
Tks, f.o.b. mill	lb.	.10	nom.	.10⅛	.10¼	.17¾	.10⅜
Refined, bbls, NY	lb.	.13½	nom.		.13½	.12	.13¼
Perilla, drs, NY	lb.	.11¾	.12	.11½	.12	.07	.11¾
Tks, Coast	lb.	.11¼	.11½	.11	.11½	.066	.11¼
Pine, see Pine Oil, Chemical Section.							
Rapeseed, blown, bbls, NY	lb.	.13½	.13¾	.13	.13¾	.086	.13½
Denatured, drs, NY	gal.	.92	.93	.85	.93	.52	.85
Red, Distilled, bbls	lb.	.11⅝	.12⅝	.11⅝	.12⅝	.08⅝	.11⅝
Tks	lb.	...	.10¾	...	.10¾	.07¾	.09¾
Salmon, Coast, 8000 gal tks	gal.	...	nom.	...	nom.	.31	.32½
Sardine, Pac Coast, tks	gal.	...	.52	.50	.55	.28	.47
Refined alkali, drs	lb.	.096	.097	.09	.097	.066	.084
Tks	lb.	...	.09	.084	.09	.062	.078
Light pressed, drs	lb.	...	.09	.084	.09	.06	.078
Tks	lb.	...	.084	.078	.084	.056	.072
Sesame, yellow, dom	lb.	.13	nom.	.13	.13¼	.12¾	.14½
White, dos	lb.	.13	nom.	.13	.13¼	.12¾	.14½
Soy Bean, crude Dom, tks, f.o.b. mills	lb.	.10½	nom.	...	.10½	.07	.10½
Crude, drs, NY	lb.	...	.11½	...	.11½	.076	.11½
Ref'd, drs, NY	lb.	.121	.12½	.12	.12½	.081	.12½
Tks	lb.	.11½	nom.	...	.11½	.07½	.11½
Sperm, 38° CT, bleached, bbls NY	lb.	.10	.102	.10	.102	.094	.102
45° CT, bleached, bbls, NY	lb.	.093	.095	.093	.095	.087	.095
Stearic Acid, double pressed dist bgs	lb.	.12½	.13½	.12½	.13½	.08½	.12½
Double pressed saponified bgs	lb.	.12¾	.13¾	.12¾	.13¾	.09	.12¾
Triple pressed dist bgs	lb.	.15½	.16½	.15½	.16½	.11¼	.15½
Stearine, Oleo, bbls	lb.	.09¾	.10	.09¾	.11½	.07¼	.12¼
Tallow City, extra loose	lb.	...	.08⅝	.08¾	.09¼	.04⅛	.08⅜
Edible, tierces	lb.	...	.09½	.09½	.10¼	.06¾	.09½
Acidless, tks, NY	lb.	...	.12¾	.12¾	.13	.07	.11¾
Turkey Red, single, bbls	lb.	.08	.08½	.08	.08½	.08	.08½
Double, bbls	lb.	.12½	.13	.12½	.13	.12½	.13½
Whale: Winter bleach, bbls, NY	lb.	.105	.107	.091	.107	.072	.087
Refined, net, bbls, NY	lb.	.101	.103	.087	.103	.068	.083



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"We"—Editorially Speaking

A cellulose film that stretches has been perfected, which is going to make it more difficult than ever to open a packet of cigarettes.

Is the Government afraid of private competition in business? How else do you explain the bill introduced by Mr. Burdick of North Dakota (H. R. 6323) forbidding the use of "U. S.," "United States," "National" and "Federal" in any business undertaking unless the Federal Government has at least 51 per cent. of the capitalization and has direct supervision of control and management.

With a nice little $2,000,000 nest egg provided in the appropriation of the Insect Pests Law to fight grasshoppers and Mormon crickets the market for arsenical insecticides ought to be good this season, which is only fair and just, since the State governments have long been the most active and successful price chisellers in this whole well-chiselled market.

They do these things differently abroad, and we note that Germany has a new law compelling all farmers to use insecticides, thus to lessen the estimated crop loss of 80 million dollars. Furthermore the Minister of Foodstuffs is authorized to destroy infected crops and disinfect infected soil, buildings, and equipment. So far so good. But read the law at the end! "Groups of farmers . . . benefiting by the law will contribute collectively towards the cost of its enforcement. Farmers will not be compensated for financial losses resulting from destruction of infected crops or other property under Government order." There's a farm improvement program for you with real teeth in it.

Thanks to the "N.F.A. News" for the quotes.

Natural methanol output for the first two months of this year was 1,035,755, an increase of 37,530 over last year. And just fifteen years ago we were all celebrating the unqualified decease of the good old wood chemical industry.

Two good old friends of the chemical industry burst on "the air" last month with typically inconsistent statements. Gerald Nye told the war-strike students at Princeton that America's participation in the World War was futile. Well, at least he tried hard to make it as futile as possible during the war days by opposing the legislation to foster and protect our coal-tar chemical industry.

And Ezekiel Mordecai declared that if another crash came it would be because our industries have failed to pass on the benefits of technological progress in lower prices to the consumers and higher wages to the workers. Believe it or not—this is the same bright little economist who refused the plea of the Chemical Foundation for public funds to develop that truly important technological development, paper from southern pine, on the ground that it would upset our world trade with Scandinavia.

Spring is the silly season and so naturally we read in the papers about such chemical miracles as a 229 per cent. liquid phosphorous fertilizer developed at Muscle Shoals; sherbets made by a college boy at Ames out of soy beans; that potash soap sharpens your razor while you shave; that last year's increase in chemical exports were due chiefly to sales of T. N. T. to Italy; that 50 per cent. of Philadelphia's drinking water is coal culm "plus good, old fashioned sewage" denatured with chlorine!

"Bookworm" in *Paper Making* pays "We" the compliment of regular quotation (which we like a lot) but he misnames this magazine *Chemical News* (which we don't like a little).

A paper box maker is advertising in this month's *Fortune* under the slogan "First in Research"—times certainly do change, for it wasn't so long ago that this same idea had to be "sold" even to a chemical company sales manager.

Looks as if "G. E." had skimmed the cream off the publicity from the Chapel Hill meeting. It doesn't seem quite fair, but at least you must give them credit for capitalizing their laboratory work.

Possibly you, too, have noticed that the best papers at A. C. S. meetings—not the "monkey gland stories" the daily press relish nor else the "fur-lined test tube" reports that only three scientists in the world can understand—but the most significant and the best written are very apt to be company papers with some tangible advertising value.

Chester Leon Baker, author of Sodium Metasilicate this issue, received his B.S. in chemistry from the University of California in 1925. His early industrial experience included work in sanitary enamelware, and the development of a process for the recovery of soda ash and borax from Searles Lake brine for West End Chemical Company. Early in 1927 he became Chief Chemist of the Philadelphia Quartz Company of California at Berkeley, and remained there for eight years. It was during this period that he worked out the commercial methods for manufacturing sodium metasilicate, as covered by several U. S. patents. In April, 1935, he was transferred to the technical staff at Philadelphia, where he is at present located.

Fifteen Years Ago

From our issues of May, 1922

Milton Kutz promoted from Philadelphia manager to general sales manager and moved to New York by Roessler & Hasslacher.

Baltimore fertilizer factories working on 24 hour, 7 day week, schedule.

H. I. Peffer formerly western sales manager elected vice president of U. S. I.

Among the contributors to a symposium on the tariff in our pages were J. H. D. Rodier (Grasselli), S. W. Wilder (Merrimac), H. W. Carr (Inyo), C. C. Baird (Baird & Maguire), Edgar M. Queeny (Monsanto), Matt F. Quinn (Olean), S. DeWitt Clough (Abbott), A. R. White (Michigan Electrochemical).

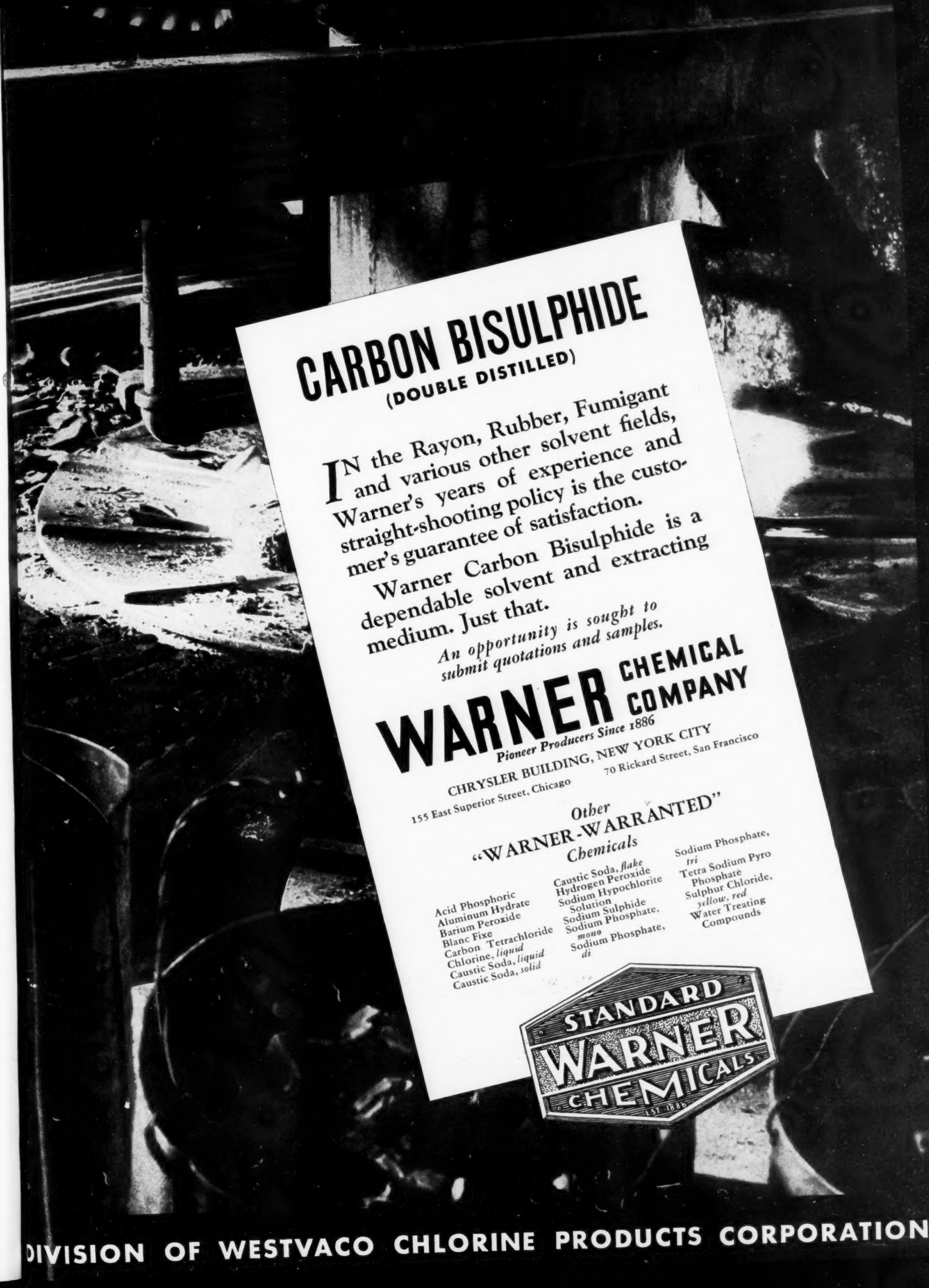
Eugene Suter & Co. incorporated in New York for $400,000.

Hooker Electrochemical Co. bought in bankruptcy plant of S. Wanders Sons & Co., Albany, N. Y., for $130,000.

Alfred F. Lichtenstein (Ciba) attended famous Ferrari stamp auction in Paris.

Senate votes to "investigate" fertilizer monopoly on ground that seven companies with 50 per cent. production control prices.

Rollin Chemical Co., Charleston, W. Va., begins production of barium chloride.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Sodium Hypochlorite Solution
Sodium Sulphide
Sodium Phosphate, mono
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